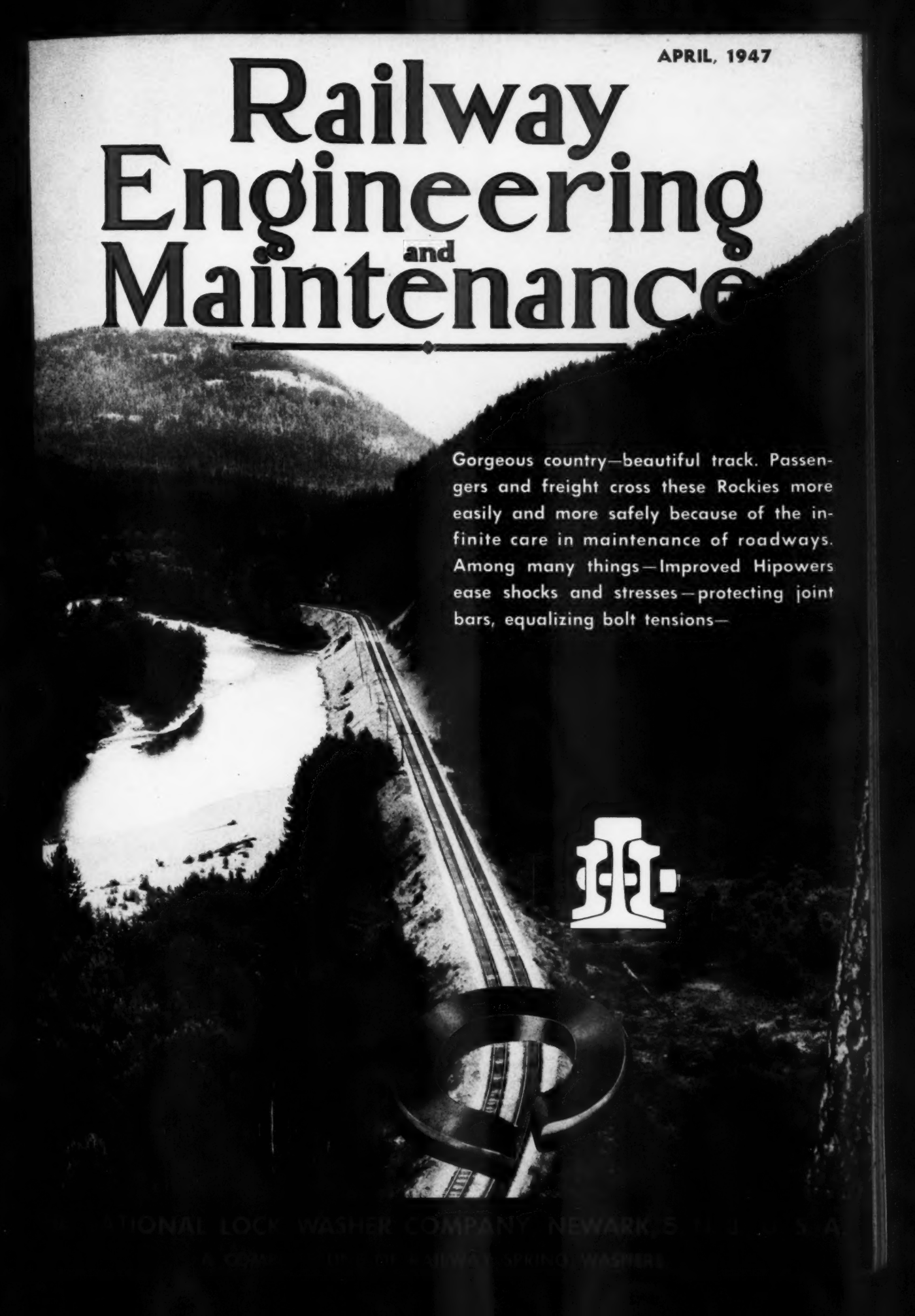
APRIL, 1947

Railway Engineering and Maintenance



Gorgeous country—beautiful track. Passengers and freight cross these Rockies more easily and more safely because of the infinite care in maintenance of roadways. Among many things—Improved Hipowers ease shocks and stresses—protecting joint bars, equalizing bolt tensions—

NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.
MANUFACTURERS OF RAILWAY SPRING WASHERS

"Edgemark of Quality"

A TOUGH proving ground FOR RAILROAD FASTENINGS

Track bolt fastenings are put to the supreme test on mainline crossovers. Shocks, stresses and strains come from every direction under the pounding of heavy freight wheel loads and speedy passenger trains. Wear is severe; maintenance problems multiply.

Under such conditions Reliance Hy-Crome Spring Washer quality is proven. Reliance Crossing Hy-Crome Spring Washers, possess necessary reactive pressure to automatically compensate for developed looseness due to resultant wear and bolt stretch.

They're manufactured from the same high-quality special analysis steel and with the same care that has made Reliance Hy-Pressure Hy-Crome Spring Washers so popular for track joint use. They cut maintenance costs. Reliance Crossing Hy-Crome Spring Washers provide a wider bearing surface for the larger crossing nuts.

Like Reliance Hy-Pressure Hy-Crome Spring Washers, you can count on Reliance Crossing Hy-Crome Spring Washers to keep crossovers tighter longer.

An interesting folder of Reliance Hy-Crome Spring Washers for Track Applications is full of information you'll find helpful in selecting a type of Reliance Hy-Crome Spring Washer for every specific track problem.

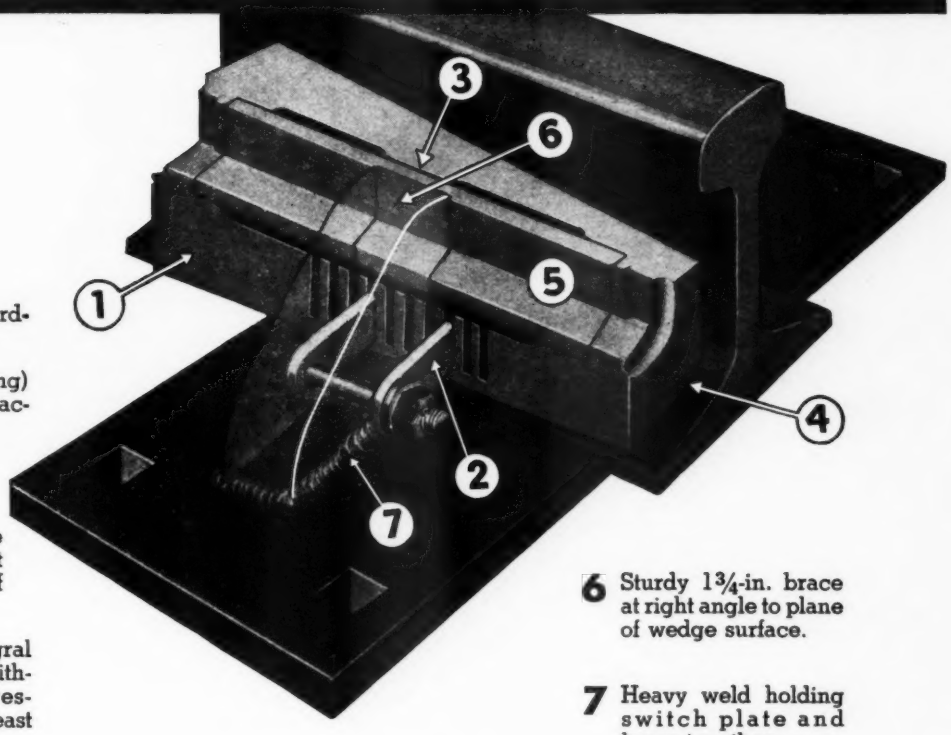
EATON

EATON MANUFACTURING COMPANY

MASSILLON, OHIO *Reliance Division*

Sales Offices: **New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal**

A Wedge does the tightening in Bethlehem's 811 Rail Brace



1 Wedge. Brinell hardness about 400.

2 Double pawl (forging) with synchronized action.

3 Compression stop.

4 Contours of wedge — shaped to fit base and web of rail.

5 Steel spring, integral with wedge. Withstands a compression force of at least 20,000 lb.

6 Sturdy 1¾-in. brace at right angle to plane of wedge surface.

7 Heavy weld holding switch plate and brace together.

One of the best ways to secure a rigid joint is to make use of the wedge principle. And Bethlehem's 811 Rail Brace is tremendously effective because of this simple, trouble-free idea.

Here's all you do with the 811:

Take a maul or hammer and drive the special wedge between the brace and the rail. Drive it in tight. Then lock it by turning down the pawls into the slots. Thus the wedge can't creep or loosen. You've got compression rigidity—*real* holding power.

We don't know any other rail brace that does so effective a job. Yet the 811 is uncomplicated, easy to install. And it's inexpensive.

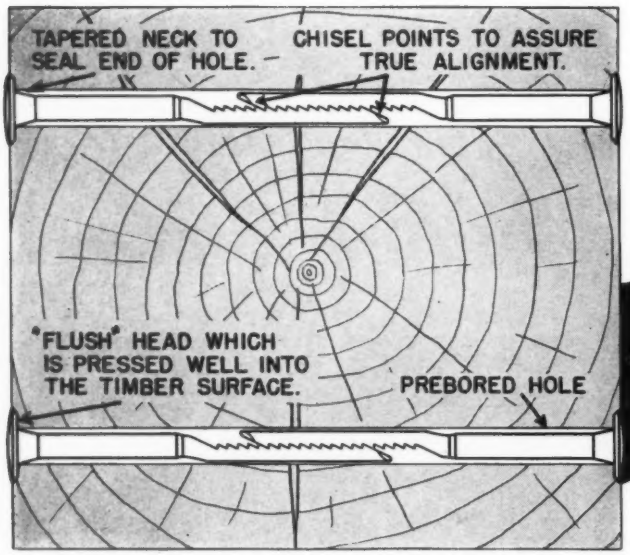
Thousands are in use by leading American railroads. If you'd like to see how the 811 works, ask a Bethlehem man to demonstrate.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

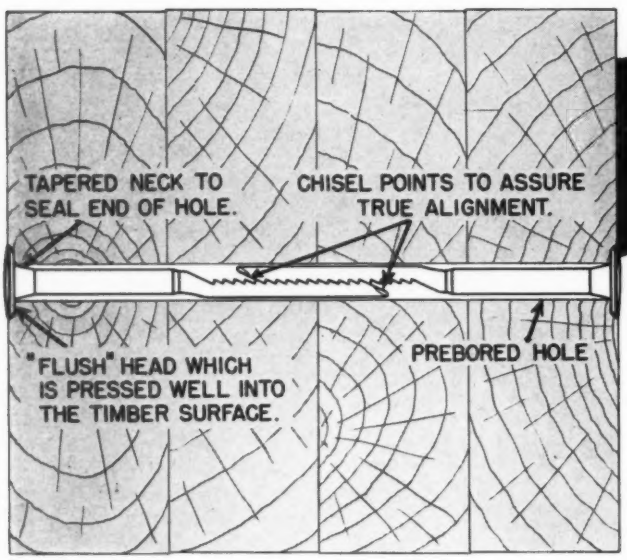
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
"FLUSH" HEAD WHICH IS PRESSED WELL INTO THE TIMBER SURFACE.
PREBORED HOLE

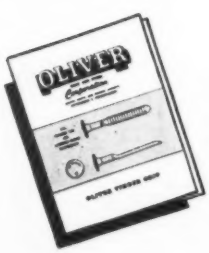
—for prolonging the life of split ties . . .


TAPERED NECK TO SEAL END OF HOLE.
CHISEL POINTS TO ASSURE TRUE ALIGNMENT.
PREBORED HOLE
"FLUSH" HEAD WHICH IS PRESSED WELL INTO THE TIMBER SURFACE.

—for fastening timbers in laminated construction . . .

The OLIVER TIMBER GRIP

The simplicity and effectiveness of the Oliver Timber Grip instantly appeals to the railroad man. We will gladly discuss with you how effectively you can use it to prevent or minimize tie splitting—or to fasten together the component timbers used in laminated construction.

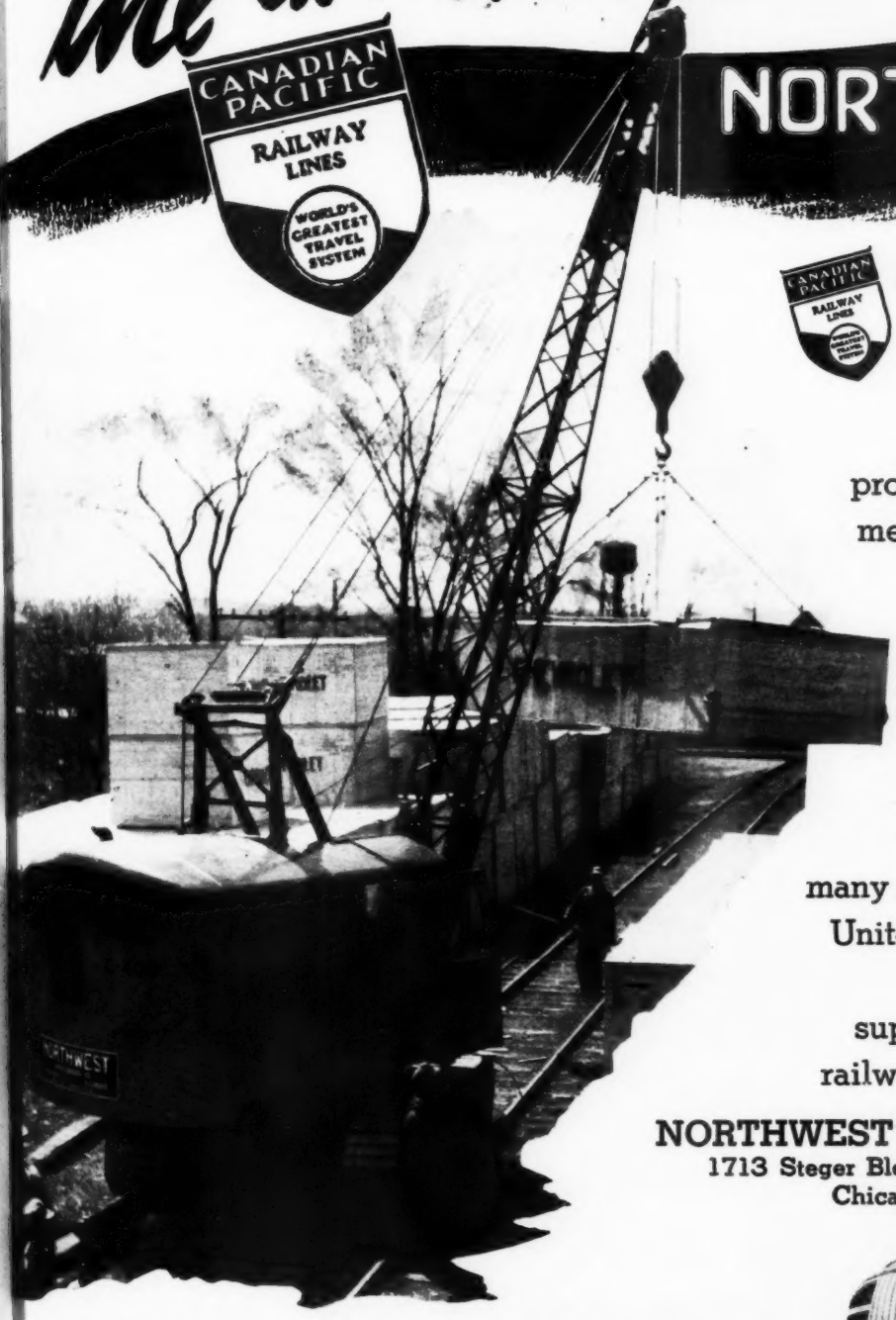


WRITE FOR BULLETIN
giving complete details of
the Oliver Timber Grip.

SOUTH TENTH AND MURIEL STREETS
PITTSBURGH 3, PA.

OLIVER
IRON AND STEEL
Corporation

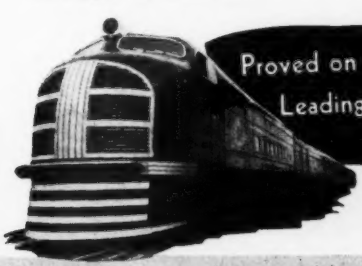
the C.P.R. buys its 10th NORTHWEST



The Canadian Pacific Railway, one of Canada's great trans-continental lines, has proved Northwest equipment in years of service.

Ten machines, nine repeat orders, make a testimonial to satisfaction that can't be equaled—and that is only one of the many class I railways in the United States and Canada that find Northwest superior for all classes of railway maintenance work.

NORTHWEST ENGINEERING CO.
1713 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois



NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL

Operation "Mudhole"

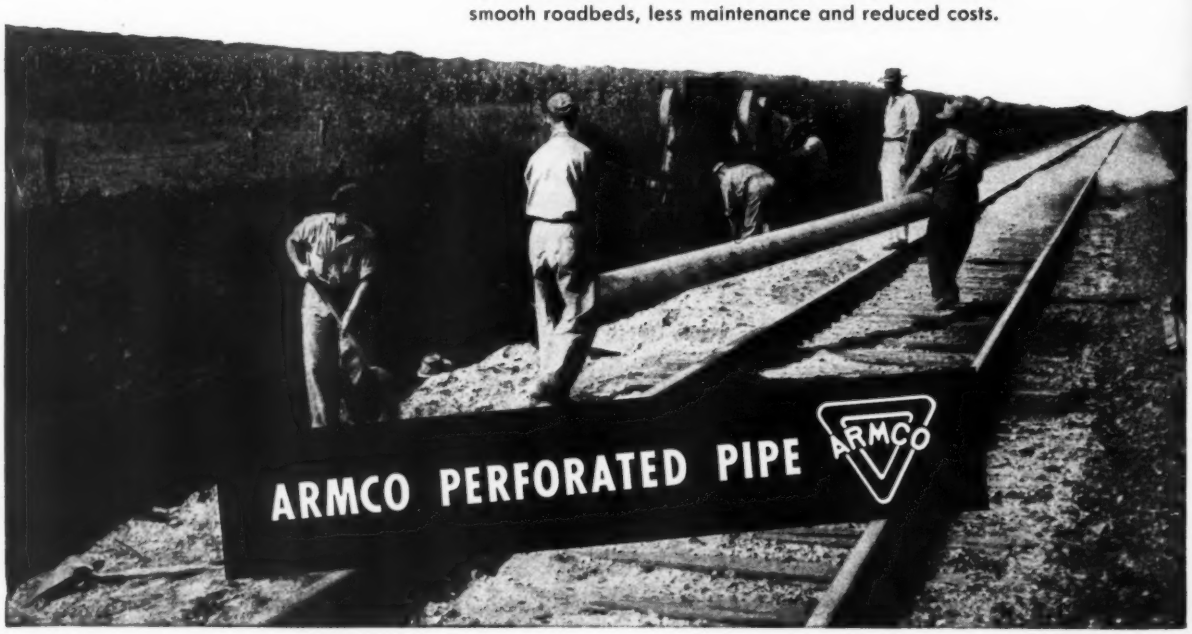
Here is a plan of attack that routes sub-surface water, arch-enemy of good roadbeds, and keeps "him" on the run. It is simple and sure. Just drain the water out and keep it out. You can do this with ARMCO Perforated Pipe.

You'll find ARMCO Pipe has many advantages for installing complete railroad subdrainage systems, or for patching up trouble wherever it occurs. This pipe is light in weight for low-cost hauling and handling. Long lengths, tightly joined with band couplers, are easily and quickly installed by unskilled workmen. The job moves fast and installation costs are low.

Breakage is no problem either. Your subdrainage system has *proved strength* to resist crushing, cracking or disjointing under the impact and weight of heavy loads. Shifting soils and severe frost action have no effect on ARMCO Pipe.

For a smooth track and good roadbed you need a firm, dry foundation. ARMCO Perforated Pipe will give it to you. It stabilizes subgrades, reduces annual maintenance expense, insures freedom from failure. Write for data. Armco Drainage & Metal Products, Inc., 1625 Curtis St., Middletown, O.

You can "outlaw" slow orders and costly maintenance by installing ARMCO Perforated Pipe. It pays off in firm, smooth roadbeds, less maintenance and reduced costs.



Bridge Braces "SHRINK" fitted

. . . FASTER
. . . CHEAPER
. . . WITHOUT LOSS OF TRAFFIC TIME

Today, many railroads have turned the old process of "flame shortening" into a new time-saving and cost-saving technique for reducing the slack in bridge eye-bar tension members.

Using standard Airco oxyacetylene flame heating equipment, "flame shortening" consists of locally heating the bridge member to be shortened, while applying axial, upsetting pressure to the member by means of a yoke. The yoke is clamped to the member on each side of the spot being heated.

Fast . . . economical . . . without any apparent effect upon the fatigue strength or the static strength of the steel, this modern adaptation of an old process can shorten eye-bars as heavy as 10″ x 2″ . . . and, can be carried on between regular scheduled train runs — an important factor to consider when determining work feasibility.

For further information about this unique process, write your nearby Airco office, or: Air Reduction, General Offices, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas.

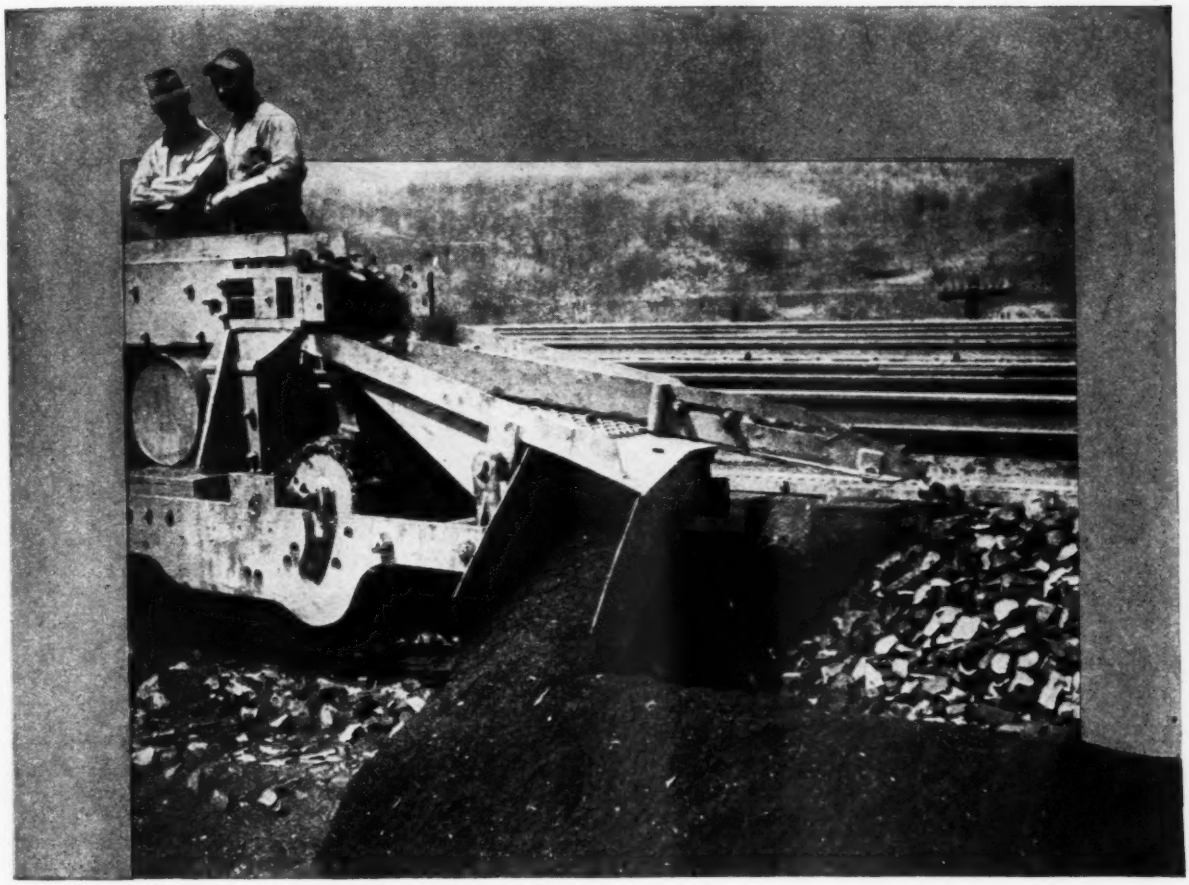
AIRCO **AIR REDUCTION**
Offices in All Principal Cities

Costs Come Down Under the Airco Plan

HOW TO
SLOW DOWN
JOB HOPPING
SPEED UP JOB FINISHING
On the main and feeder lines of an increasing number of America's railroads, Barco Unit Tytampers are turning out mile after mile of uniform tamping for busy maintenance men. Whether used singly or in a crew, these portable, self-contained powerhouses enable more work to be done per shift. And maintenance men will tell you that labor crews prefer to stick with the section gangs equipped with Barco. Write for further information.
BARCO
UNIT TYTAMPERS
FREE ENTERPRISE—THE CORNERSTONE
OF AMERICAN PROSPERITY

BARCO MANUFACTURING CO., NOT INC. • **1805 Winnemac Avenue, Chicago 40, Illinois**

In Canada: **The Holden Company, Ltd., Montreal, Canada**



Pay dirt... from your roadbed. With the McWilliams "Mole" Ballast Cleaner you don't have to prospect for proper roadbed maintenance. You can stake your claim on a "Mole" and be sure that you have the most economical and efficient method of cleaning cinders and dirt from your track ballast—a necessity in these days of fast schedules and heavy loads. The McWilliams "Mole" is available in intertrack and border models. Write today for complete information.

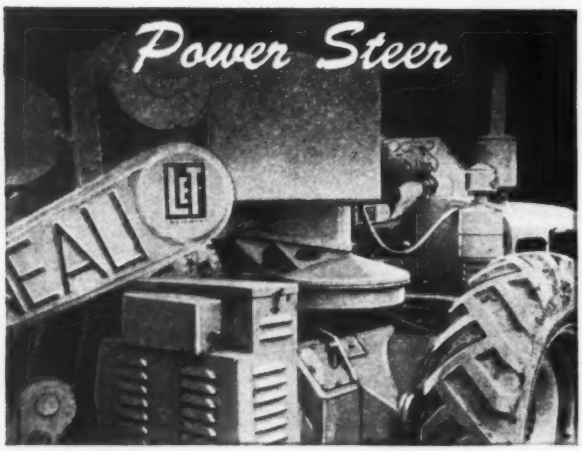
RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

ONE-MAN ... New small

Bowl, apron, tailgate and steering controlled by Tournatorque electric motors. Each operation finger-tip controlled from dashboard. The Tournatorque electric motor is a new type of AC motor with the lugging characteristics of DC motors. Tournatorque electric motors and generators are simpler in operation and maintenance than the electric starter on your car or truck.

This new Tournapull hauls through loose sand, mud, snow or ice that would stall any previous wheeled vehicle. The revolutionary Tournamatic differential is so designed to make one wheel pull 4 times harder than the other before it will slip. Most power is automatically supplied to the wheel on firmest footing.



Electric motor operates a steering gear on the yoke king-pin. This locks Tournapull and Carryall into a single unit and keeps rig traveling in desired direction, regardless of underfoot conditions. Operator merely pushes a button to turn . . . Tournapull continues on same course until operator again pushes control button for right or left turn. Selective 2-speed steering gives positive control.

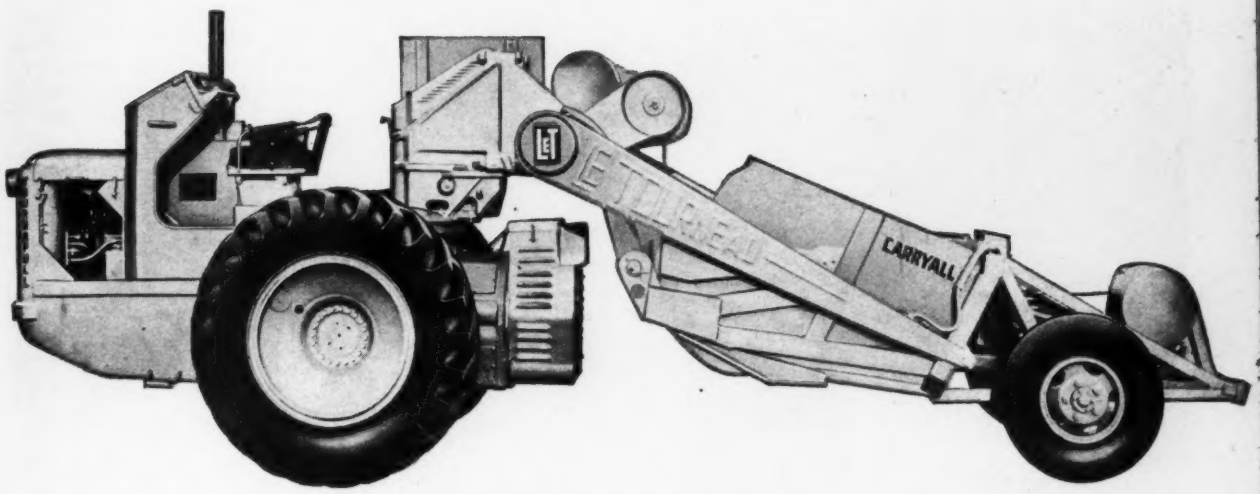
Electric control, power steer, positive traction make the new Tournapulls easy for the operator. Finger-tip controls for steering and all Scraper operation from a single control panel take the labor out of operating . . . reduce operator fatigue. Comfortable spring-cushioned seat, plus shock-absorbing rubber tires are a few more reasons why operators like the new Tournapulls.

Tournapull Carryall — Trade Mark Reg. U. S. Pat. Off.

LET — LE TOURNEAU — EQUIPMENT

For complete information on this one-man maintenance gang see your Le Tourneau Distributor NOW.

DIRTMOVER
TOURNAPULL



CLEARS slides; fills washouts; loads, hauls and spreads surfacing; strips and works gravel pits; digs stockponds; fills lots; levels building sites; grades and surfaces driveways or access roads; builds small dams or levees. Travels fast over pavements or cross country . . . no trailer or haul equipment needed. Continuous mesh Tournamatic transmission . . . no delay for shifting gears. Fills tank at any filling station.

SELF LOADING

3.3 YARDS STRUCK

85 H.P. GASOLINE ENGINE

TIRES { 14:00x32 PRIMEMOVER
9:00x16 ON CARRYALL

WEIGHS 7½ TONS EMPTY

Production per hour

One-way haul	Yards per hr.
200′	48
400′	45
600′	42
800′	40
1000′	38
1500′	33
2000′	30
2500′	27
3000′	24
4000′	21
5000′	18

Above production figures based on average type scraper material, fairly level haul, good working conditions. Figures show production for 60-minute hour, one-man operation, no pusher.

LE TOURNEAU
PEORIA, ILLINOIS

JOB-PROVED Over 5000 Built and Shipped

TOURNAPULLS

PULL and DRIVE Spikes the Nordberg Way

Pulling Spikes

Quick removal of spikes by these two Nordberg Spike Pullers speeds up rail laying. Each machine will pull from 35 to 45 spikes per minute.

Driving Spikes

Close behind the rail laying gang, two Nordberg Spike Hammers working in tandem drive about 1600 spikes an hour.

Nordberg Power Tools For Your Track Maintenance

Spike Puller
Spike Hammer
Adzing Machine
Track Wrench
Rail Drill
Cribex
Power Jack
Surface Grinder
Utility Grinder
Flexible Arm Grinder
Midget Grinder
Track Shifter

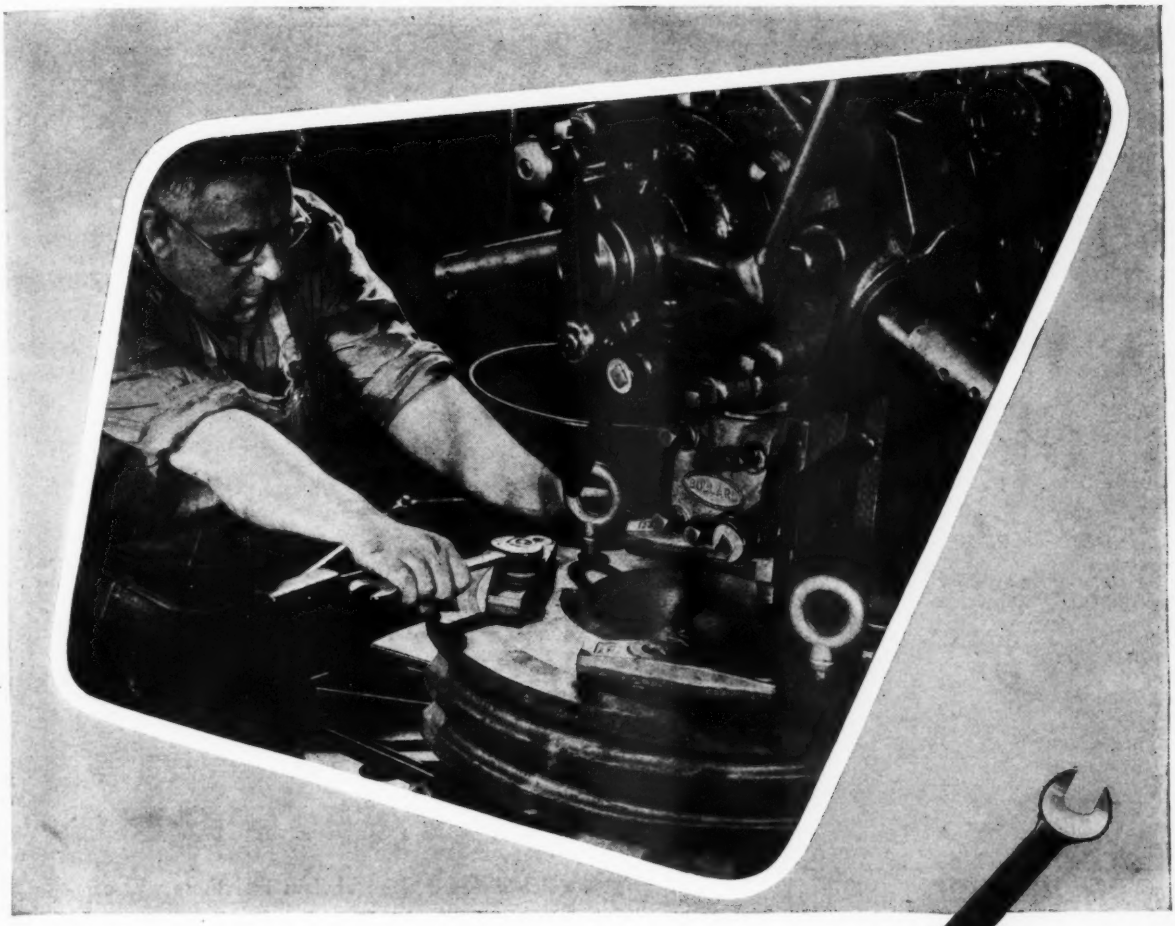
Getting out spikes from the old rail and re-spiking the new rail are two operations that when mechanized are done at a big saving in time, manpower and expense. With power tools developed by Nordberg, these no longer are hand operations. One of the more recent tools brought out by Nordberg for rail maintenance is the Spike Hammer, a machine which drives spikes faster and easier, all driven straight, to the correct depth, and with no possibility of damage to rail by a misdirected blow. Driving spikes the Nordberg way is now the easiest job in rail laying and permits the spiking to be completed as rapidly as the new rail can be laid. If your spike pulling and driving operations are not fully mechanized, investigate the advantages of Nordberg spike tools.

NORDBERG MFG. CO. MILWAUKEE 7, WIS.

NORDBERG POWER TOOLS

for better maintained track at less expense

For additional information, use postcard, pages 419-420



WILLIAMS WRENCHES
Reduce set-up time

Machine tools make money only when producing. Set-up time is non-productive, but it can be minimized by having *enough* of the *proper* wrenches at hand when setting-up.

Williams "Superior" Carbon Steel Wrenches—made in 50 patterns, over 1000 sizes—have been industry's standby for more than half a century. Forged from specially-processed carbon steel, they average 93% as strong as corresponding alloy wrenches costing almost twice as much. Sold by Industrial Distributors everywhere.

J. H. WILLIAMS & CO., BUFFALO 7, NEW YORK

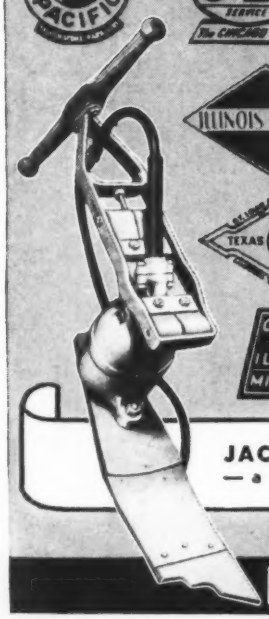
WILLIAMS
DROP-FORGINGS AND DROP-FORGED TOOLS

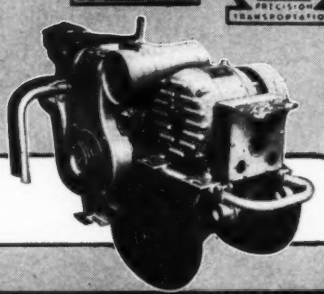
More than 4 out of 5 of the Leading Roads Extensively use

JACKSON VIBRATORY TIE-TAMPERS

. . . which makes it quite obvious that those who carefully investigate, find JACKSON Tie Tampers, Power Plants and Methods, a superior means of surmounting the particularly knotty problem of how to achieve better track, less expensively — in the face of extremely heavy traffic conditions and the highest wage scale in history.

Judge for yourself! Ask for a JACKSON field engineer to give you an on-the-job demonstration. Informative literature gladly sent on request. Drop us a line, NOW!





JACKSON TIE TAMPERS AND POWER PLANTS
— a champion combination in any Tamper application

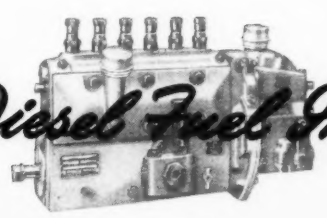
ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON MICHIGAN

SKILL ..at your Service

At American Bosch, the experience-born skill of thousands of pairs of hands operating modern machines is at the service of the American Diesel industry and its thousands of users.

So, too, are available the experience of engineers who have worked closely with the industry for years . . . fully equipped laboratories . . . productive capacity that has kept pace with the industry's rapid growth . . . field service which keeps the equipment operating as the makers intended . . .

. . . which may serve to explain why a large majority of America's Diesel Builders equip their engines with American Bosch Diesel Fuel Injection Equipment. AMERICAN BOSCH CORPORATION, Springfield 7, Mass.



AMERICAN BOSCH

Diesel Fuel Injection

AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS

PRECISION. Here's a typical Gradall job – cleaning several thousand feet of neglected ditches at low cost. Properly pitched ditch bottoms and perfectly graded slopes without costly clean-up labor are a result of Gradall accuracy.

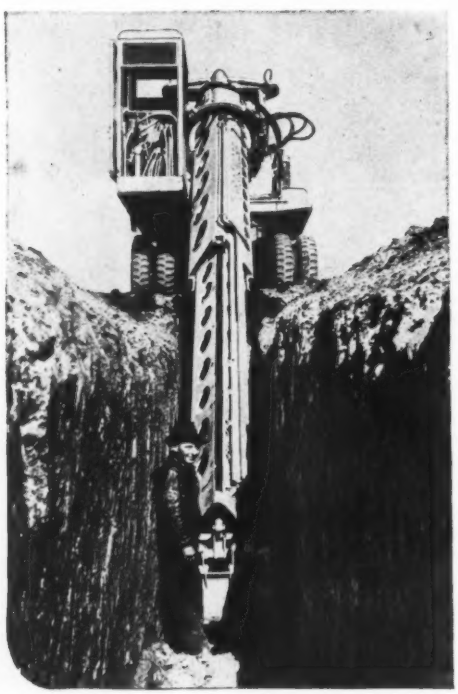
THE *New*

GRADALL

DOES THINGS

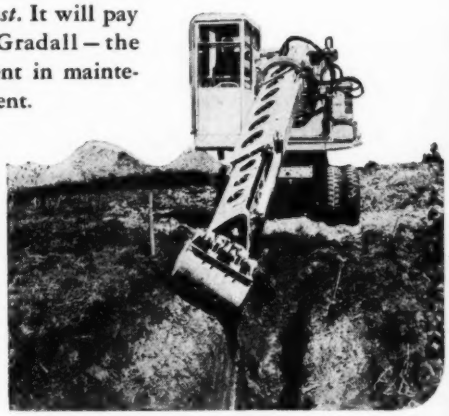
One machine NEVER DID BEFORE!

VERSATILITY. A quick change of attachments (less than 15 minutes to change tools) and Gradall is ready for the next job. This time it's a ten-foot trench with sheer clean-cut sides.



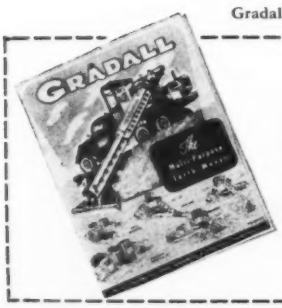
FAST TRENCHING AND DITCHING are only two of many railroad maintenance jobs performed by Gradall. Now *one machine* will handle a wide variety of off-track maintenance work such as: WIDENING CUTS AND FILLS, EXCAVATING, RESTORING EMBANKMENTS, SLOPING AND GRADING, BACK FILLING, RIPPING AND LOADING OLD PAVING, SNOW REMOVAL AND LOADING.

A five year test program, using pilot models on actual pay jobs, has *proved* Gradall does jobs *better* and at *lower cost.* It will pay you to investigate Gradall – the really *new* development in maintenance-of-way equipment.



DEXTERITY. Gradall "Arm Action" tilts the tool in chamfering trench corners to prevent falling back of loose dirt and rock. But Gradall has only started the job; it will lay pipe and backfill, too.

Gradall Reg. U. S. Pat. Off.



SEND FOR BOOKLET

...giving complete specifications and facts.

GRADALL DIVISION

WARNER & SWASEY

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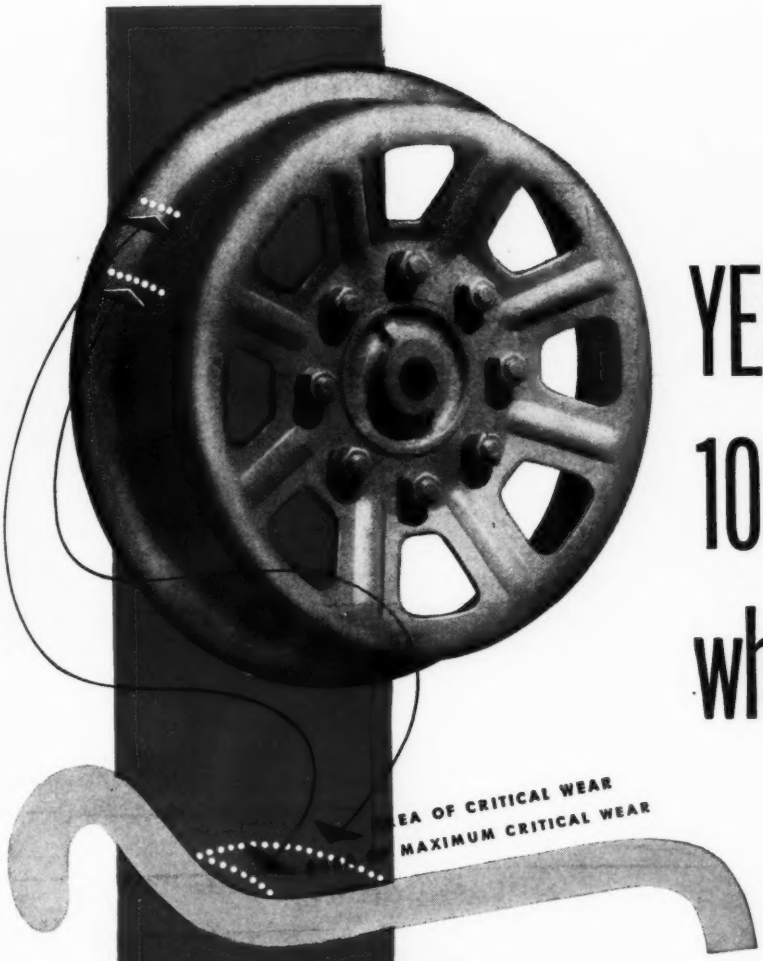
WARNER & SWASEY COMPANY
Cleveland 3, Ohio

Please send the new GRADALL Book to:

Name .....

Address .....

City ..... *State* *N-447*



YES... 10 to 15% more wheel mileage!

Fairbanks-Morse Demountable-Hub Wheel Has Extra Thickness at Area of Critical Wear

Here's a one-piece, solid steel demountable-hub wheel that gives a minimum of 10 to 15% longer mileage! The Fairbanks-Morse method of cold-pressing gives extra thickness at the area of maximum critical wear—a thickness that is 10 to 15% greater than the average wheel tread thickness outside this area!

Utilizing a die-forged demountable hub, the new Fairbanks-Morse Demountable-Hub Wheel requires no special tools for mounting or demounting.

It is available in standard A.R.E.A. 16- and 20-inch sizes, plus a newly developed 14-inch size. Full details are set forth in a new descriptive bulletin—send coupon for it today.

Fairbanks, Morse & Co.
Dept. Y
Chicago 5, Illinois

Gentlemen:
Please send new bulletin on Fairbanks-Morse Demountable-Hub Steel Wheels with new die-forged steel hubs.

Name_____

Address_____

City_____

State_____

Fairbanks-Morse

A name worth remembering

Diesel Locomotives
Diesel Engines
Generators • Motors
Pumps • Scales
Magnetos • Stokers
Railroad Motor Cars and Standpipes
Farm Equipment

They began specifying J-M ASBESTOS SHINGLES back in 1921...

and this roof on the Mars Hill station of the Bangor and Aroostook has withstood Maine's extremes of cold and heat for a quarter of a century!

BACK IN 1921, this attractive and durable roof of J-M Asbestos Shingles became the first of numerous long-lasting installations that have since been specified for all major buildings of this progressive Maine line.

Today... after more than 25 years' exposure to sun, wind and rain... its protection is as complete as the day it was put on over an old cedar shingle roof!

Cases like this – one of many "old-timers" among J-M Asbestos Shingle roofs in railroad service – are the best proof that these shingles are built to last. Both fireproof and rotproof, *not one* has ever burned or worn out. And maintenance in most cases has been next to nothing!

You'll be pleased to learn how little it will cost to get this same long-lasting, low-cost protection for buildings along your right of way. Get full information by writing Johns-Manville at New York, Chicago, Cleveland, St. Louis or San Francisco.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

89 YEARS OF SERVICE TO TRANSPORTATION

As long as there is the slightest opening at rail ends, batter cannot be prevented. But a "butterfly" will retard batter and postpone that day when rail-ends must be rebuilt or rails replaced.

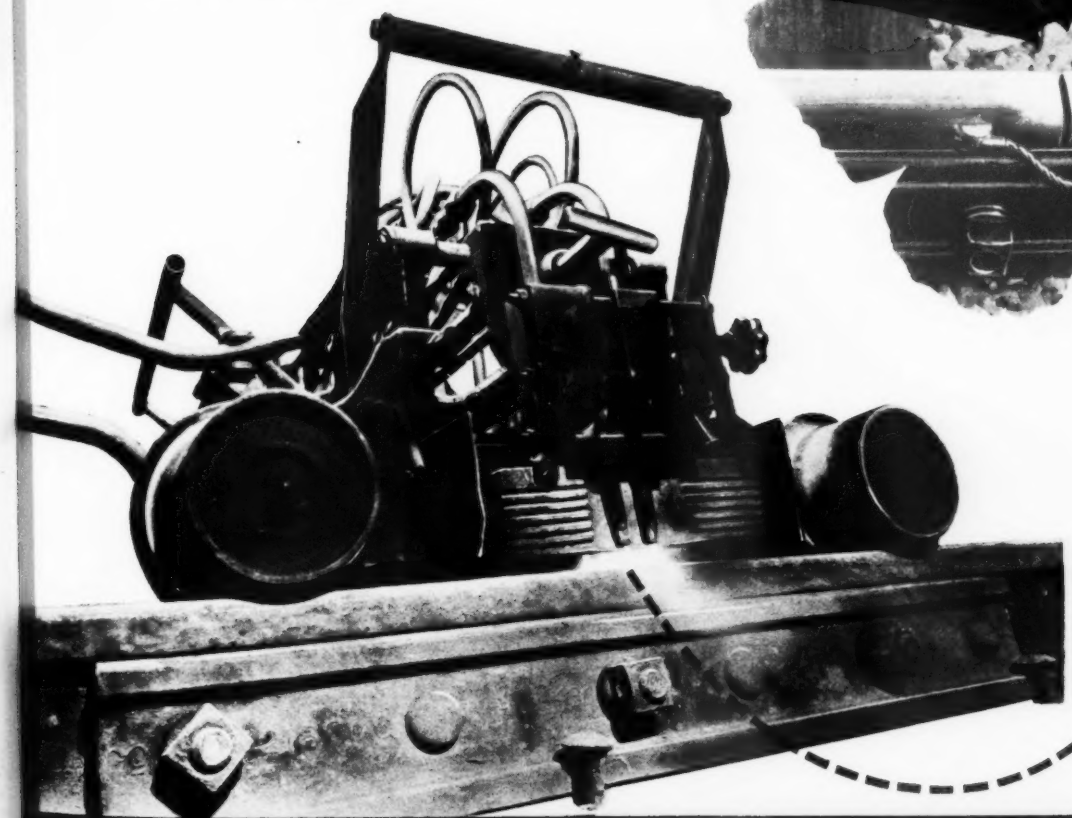
The "butterfly" pattern — a uniformly hard, batter-resistant surface at points of greatest wear—distinguishes rail-ends hardened by the Oxweld oxy-acetylene method.

During a six-year period, with 267 million tons of traffic passing over the rails, Oxweld hardened rail-ends had 58 per cent less batter than unhardened rails — 12.21 thousandths batter for unhardened rails compared to 5.11 thousandths batter for rail-ends hardened by Oxweld methods.

Oxy-acetylene rail-end hardening retards batter, lengthens the life of rail in first position, and reduces track maintenance costs. Ask an Oxweld representative to help you plan your program.

Rail-end hardening is another Oxweld service developed as a result of working with American railroads for more than a third of a century.

A "Butterfly" PROTECTS RAIL ENDS



THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
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Carbide and Carbon Building Chicago and New York
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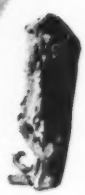
Canadian Railroad Service Company, Limited, Toronto

OXWELD RAILROAD SERVICE

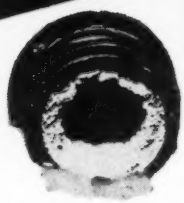
SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

MORE GALLONS PER MINUTE...

when Pipes get rid of STUFF LIKE THIS!



Piece of lead sheared off by Pittsburgh hydraulic cleaner and removed from 12" water line. Such objects removed from lines have reduced pumping pressures as much as 50 per cent.



Incrustation and organic growth are completely removed from water lines by Pittsburgh Pipe Cleaner methods. Old lines can be restored to fullest capacity with minimum interruption of service.

This shovel lodged in a 45° bend of a 12" water line of a mid-Western railroad caused an estimated increase of $2,500 in pumping costs. Slow delivery of water caused by plugged and clogged lines can be eliminated by Pittsburgh Pipe Cleaner service . . . at a fraction of the cost of replacement.

Pittsburgh Pipe Cleaning methods remove ALL obstructions from water lines and sewers . . .

Tuberculation, incrustation and large objects lodged in pipes are hidden menaces to the efficiency of water supply lines and drainage systems. That is why it pays to have water lines and sewers cleaned by Pittsburgh Pipe Cleaner experts. Supply and drainage lines are restored to fullest capacity because ALL OBSTRUCTIONS ARE REMOVED. Pittsburgh's hydraulic and mechanical methods of pipe cleaning do the job quickly, thoroughly and economically. Investigate today and learn how Pittsburgh Contract Pipe Cleaning Service can help to stretch your maintenance dollars.

Slab, rocks and pieces of wood removed from 710 ft. of 24" sewer speeded up water disposal and reduced damage from floods and high water. Hundreds of tons of sand, silt and mud removed from yard sewers by Pittsburgh Pipe Cleaner service have restored drainage systems to top capacity.

PITTSBURGH PIPE CLEANING COMPANY

133 Dahlem St., Pittsburgh 6, Pa.

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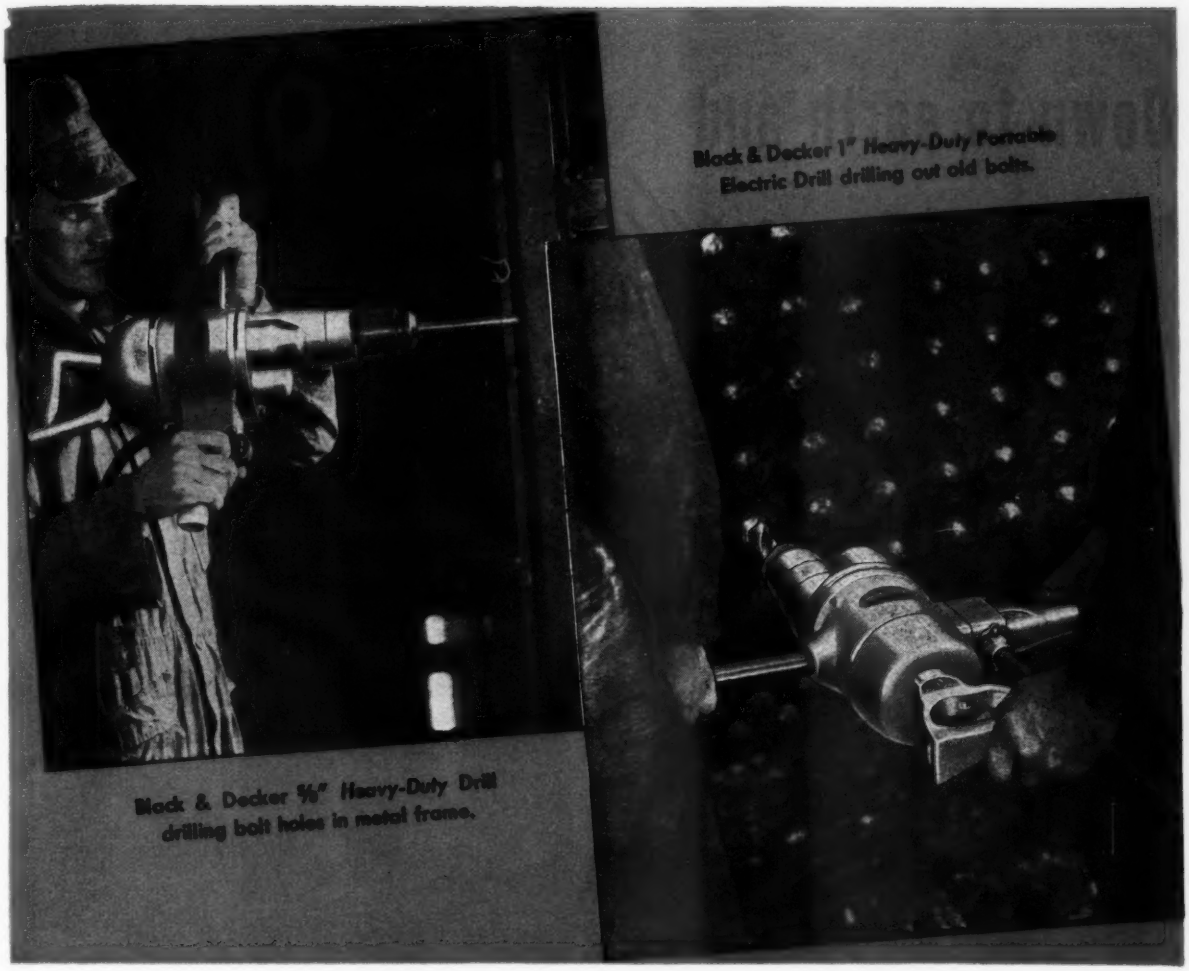

Black & Decker ⅝" Heavy-Duty Drill drilling bolt holes in metal frame.

Black & Decker 1" Heavy-Duty Portable Electric Drill drilling out old bolts.

These RUGGED DRILLS Speed Up Heavy-Duty Work

Turn your toughest drilling jobs over to Black & Decker *Heavy-Duty* Electric Drills . . . and watch your output jump! These high-powered Drills handle *continuous*, heavy-duty drilling, wood boring and hole sawing. From spade handle to chuck, they're built to take it! Their heavy-duty, B & D-built motors are specially constructed for constant service. Heavy-duty gears and ball bearings are used throughout. Roller bearings on chuck spindle withstand severe side and end thrust.

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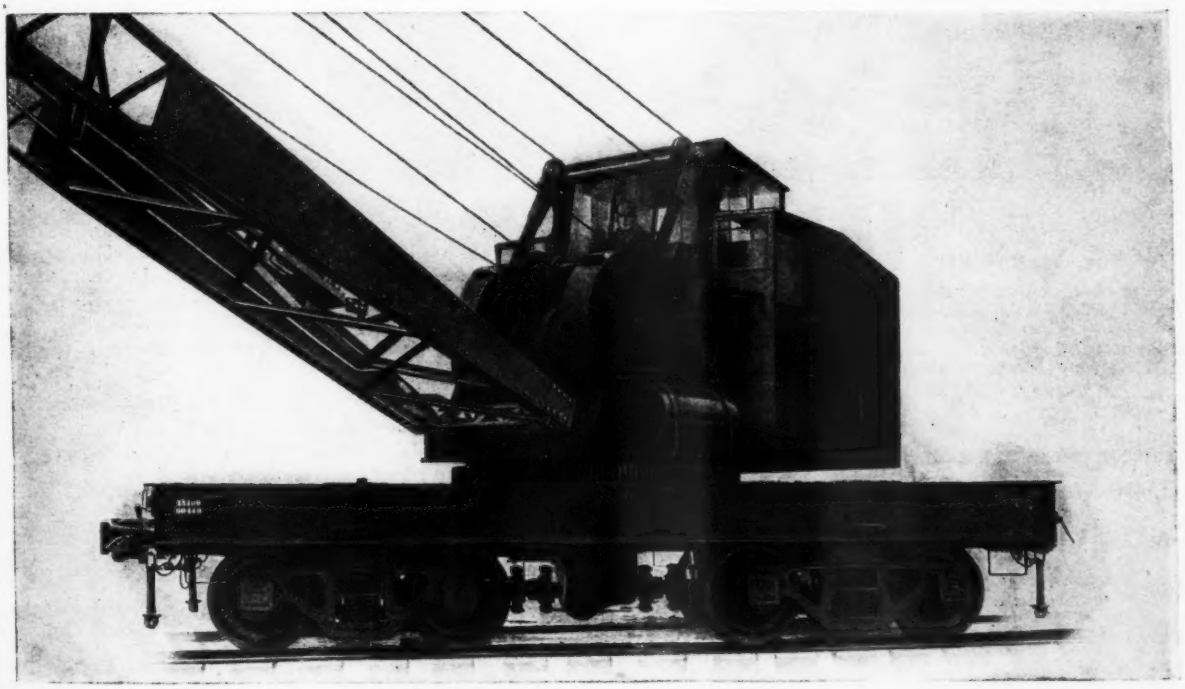

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BECAUSE WEED PROBLEMS VARY with the kind of weed, soil conditions and climate, The Dow Chemical Company—major producer of the powerful new weed killing chemicals—has developed various *types* of weed killers. Each is designed to do its particular job well. Each has been tested and proved in the field under competent supervision. And the results of these tests—together with many reports from satisfied users—are available for your inspection.

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For additional information, use postcard, pages 419-420

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more Uses for the "MAINTENANCE handyman"

Working on the right of way . . . tie tamping, welding rail ends, cutting grades and ditches . . . isn't all the "maintenance handy man," an Oliver "Cletrac" crawler tractor does. It's equally useful around shops, yards and depots.

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For all the facts, write The OLIVER Corporation, Industrial Division, 19300 Euclid Avenue, Cleveland 17, Ohio.

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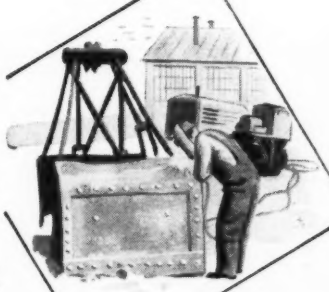

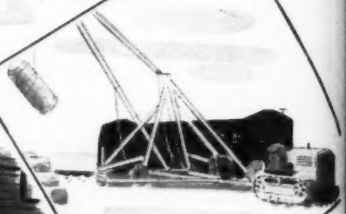

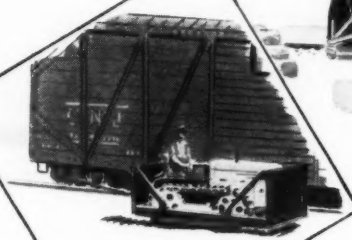

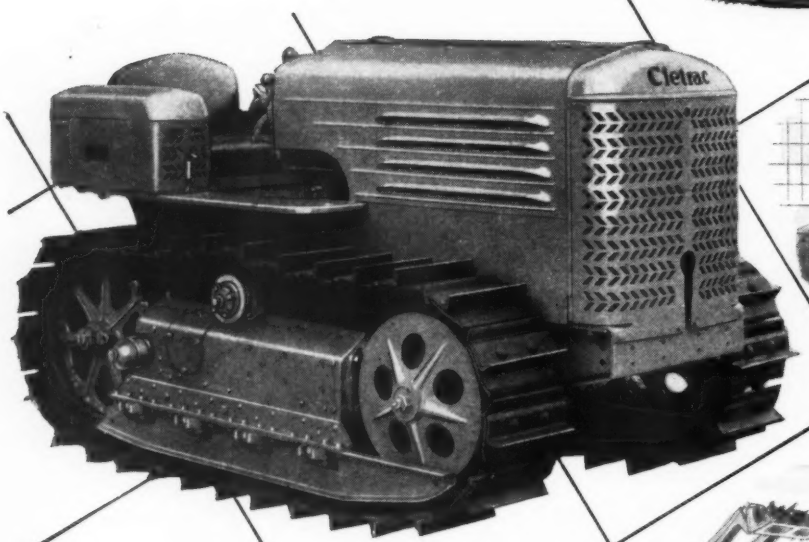

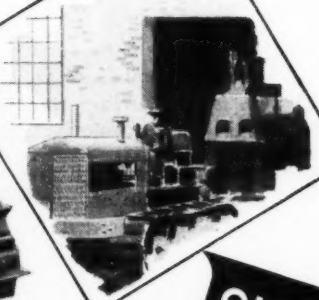

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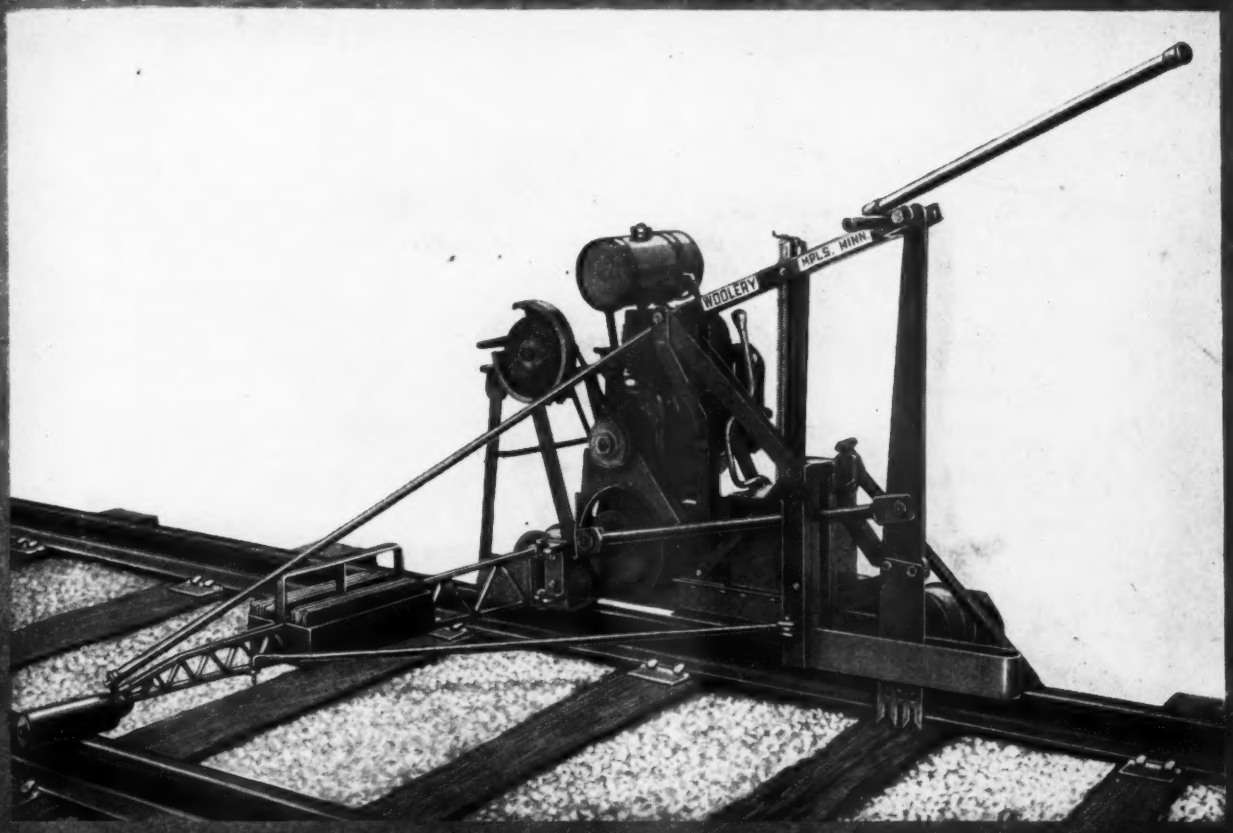

THE NEW WOOLERY TIE CUTTER—MODEL N

Improved Simplified Design
enables us to produce
A Better Machine at Lower Cost

INCORPORATING the basic features of the original WOOLERY Tie Cutter, the new improved Model N is a simplified, sturdy efficient machine which we are proud to offer Railway Maintenance Departments at a favorable ***reduction in price.***

This new lowered purchase cost has been made possible,—in spite of rising labor and material prices,—by skilled engineering to achieve production economies. At the same time, the redesigned Tie Cutter, with a more powerful engine, double roller chain drive, and more compact form saves time and back-breaking labor in the work of removing old ties with a minimum of roadbed disturbance.

The reciprocating cutting blade is adjustable for depth of cut and lateral spacing from rail or tie plate. Its average cutting time is 25 seconds per cut. Old ties cut in three pieces are easily pried out with a bar, using the center section as a heel and removing it last. The new tie is readily seated on a firm, permanent base requiring little or no tamping.

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TIE CUTTERS - WEED BURNERS - CREOSOTE SPRAYERS

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

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No. 220 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: Thanks to You!

April 1, 1947

Dear Readers:

There is something on my mind as this issue goes to press that I want to share with you—share with you as being more deserving than we ourselves—and that is the many compliments that we have received of late for the timely information that we have been bringing to you from month to month relative to activities in the field of railway engineering and maintenance.

Expressions of appreciation, good will and cooperation from you men out on the job are not new to us, because you have been more than generous in this respect over the years, but they have so piled up in recent weeks that at the risk of being criticized for conceit, I refer to them with only one purpose—to turn back to many of you your highly deserved share of these compliments, which we are well aware would never have come without your, often unseen, hand in our efforts.

Maybe this matter is on my mind especially as the result of things heard and overheard at the recent annual meeting of the American Railway Engineering Association, and the exhibit of the National Railway Appliances Association here in Chicago, including words of tribute to our publication and the Railway Age directly from the floor of the convention. But, regardless, I feel constrained to make clear, without further delay, our feeling that it is in large measure to you that these compliments should have been addressed—you who tell us of your problems and plans; who take us over work and special projects in the field; who write to us unsolicited of interesting developments under way or in prospect; and who not only contribute so constructively to our "What's the Answer?" columns, but frequently to our feature pages as well.

Only within the last few days, one chief maintenance officer, submitting certain information for publication, wrote to me as follows: "Your endeavors in furthering the interests of the American railroads are appreciated, and any further information you require for publication, please feel free to request." This is the kind of cooperation that I have in mind when I say that the lion's share of the compliments that come to us should rightly be addressed to many of you.

In the interest of meriting continued commendation, which can only come through producing a publication that will be of maximum help to you, we earnestly solicit your continued cooperation in the future, assuring you in advance of our deep appreciation and of our determination to make the most of it in the interest of both yourselves and your fellow engineering and maintenance officers.

Sincerely,

Neal D. Howard
Editor

NDH:jb

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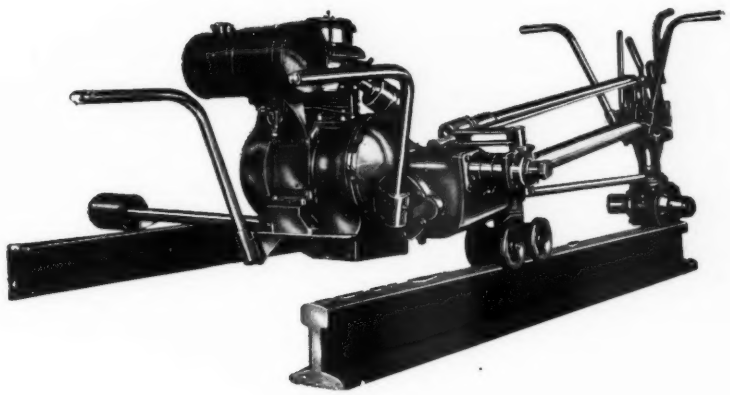
Tighten track nuts with Raco Power Track Wrench



Some roads do and some do not tighten out-of-face with their Raco Power Wrenches.

But those who do tighten track nuts periodically claim great benefits from improved track, reduced wear, and consequent savings effected.

For this job the Raco Wrench is perfection. It not only saves its cost very quickly compared to hand tightening, but by producing absolutely uniform torque on each nut, reduces the number of tightenings required.

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"ALL ABOARD! A-BOAR-R-R-D!" As the train, gathering speed, leaves the station, passengers follow their individual inclinations—entirely confident of their personal safety. They know that absolute order will be maintained.

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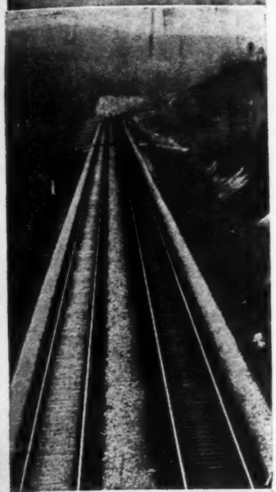

Published on the first day of each month by the

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 West Adams St., Chicago 3

New York 7, 30 Church Street

Cleveland 13, Terminal Tower

Washington, D.C., 4, 1081 National Press Bldg.

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Railway Engineering and Maintenance

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APRIL, 1947

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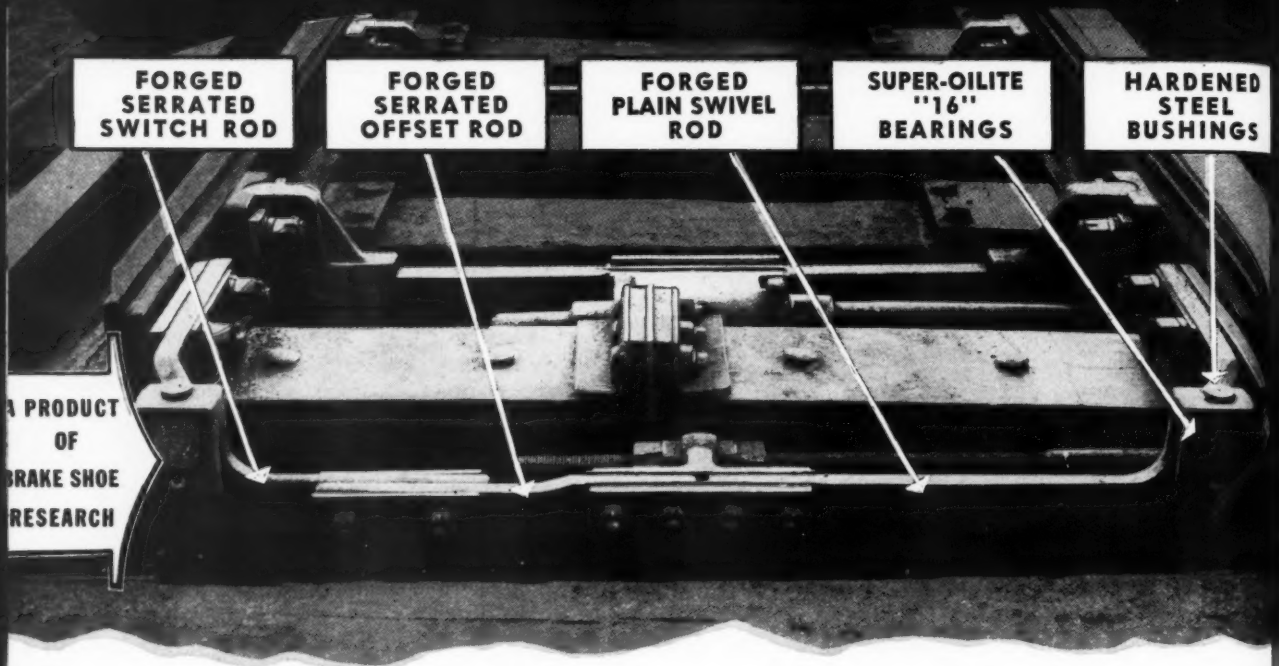
RACOR *Free-Swiveling* VERTICAL FRONT RO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SUPER-OILITE "16" BEARINGS
HARDENED STEEL BUSHINGS
A PRODUCT OF BRAKE SHOE RESEARCH

eliminates switch throw resistance and strai

Here is the new free-swiveling "MF" vertical front rod that eliminates maintenance and replacement costs experienced with conventional or rigidly bolted front rods. Now equipped with Oilite bearings, hardened steel bushings and pins, this new RACOR assembly assures smooth and easy operation of switch points. When installed with Vertical Type "M", No. 1, No. 2 and additional vertical back rods, switch operation is more economical and switch maintenance reduced.

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ONLY RAMAPO HAS PLANTS FROM COAST TO COAST TO EXPEDITE AMERICA'S RAILROAD NEE

Railway Engineering and Maintenance

Essential—

An Adequate Financial Return for the Railroads

Under the system of private free enterprise and fair competition to which we in the United States are dedicated, in which ingenuity, initiative, quality and service play such an important part, the only sure guarantee that this system, with all its advantages, will survive and prosper, is that reasonable net earnings—for expansion, improvements and a fair return to investors—will be allowed to prevail. A business or industry that *cannot earn* a reasonable return on its investments must fail in competition with other businesses or industries, and just as certain, a business or industry that is *not allowed to earn* a return commensurate with its essential needs for expansion, improvements and reward to those who have invested their money in it, must either fail or become socialized by government action.

Why is this question raised here? Because the railway industry—your industry—is in financial jeopardy, and, as a result, the best interests of your country are in jeopardy, and your very job is far from as secure as it might well be. Contrary to the general belief of the public, and most railway employees, that the railways make a 15 per cent return on their net investment, and that a 10 per cent return would be fair, as shown by a recent public opinion survey, the railways, largely as the result of government action or inaction, have been existing on starvation earnings, insufficient in many instances to their barest necessities, and totally inadequate to permit the improvements that are essential in their equipment and fixed properties to meet the needs of the country for adequate transportation facilities.

Everywhere in official railway circles the cry to be permitted to earn a fair return is being raised, the general figure set being, not the 15 per cent the public thinks the railways earn, nor the 10 per cent which it thinks would be fair, but rather 6 per cent, which is considered necessary to permit the roads to compete with other industries for the capital necessary for them to revitalize their properties and insure the public the kind of service for which it is clamoring, and to which it is entitled.

In a recent statement commenting on a report on Railroad Finance made by the Bureau of Railway Economics for the Railroad Committee for the Study of Transportation, a research group of the Association of American Railroads, Judge R. V. Fletcher, president of the A.A.R., pointed out that, on their net investment, estimated at approximately $23 billion by the railroads themselves, the roads as a whole, during the past 25 years, have earned only about 3¼ per cent, or on the Interstate Commerce Commission's lower valuation of less than $21 billion, less than 4 per cent—and this, he emphasized, represents an average return for a period that included both the boom decade of the Twenties, and the five years of World War II when the railroads performed their greatest service and collected their greatest revenues.

Furthermore, in 1946, when the railroads handled the heaviest peacetime traffic in their history, they earned only 2¾ per cent on their net investment, and less than 3¼ per cent on the I.C.C. valuation—out of which they had to meet interest, rents and other fixed charges, pay dividends, and finance improvements. Even with the increase in freight rates authorized by the commission, effective January 1, to meet to some extent the increases that have occurred since 1939 in wages and in the prices of materials and fuel, it is not expected that in 1947 the roads will earn more than 3 per cent on their investment figure, or more than 3½ per cent on the I.C.C. valuation.

(Continued on next page)

In comparison with the rate of return earned on capital invested in railroad property, the return on capital invested in manufacturing and other general lines of business is about 2½ times as much, and the return on capital invested in other regulated industries, such as telephone companies and electric utilities, is about twice as much. Furthermore, the rate of return earned by the railways has been and continues to be far below the 5¾ per cent established as a fair return for the railroads by the I.C.C. in 1922, and is only about half of what the Supreme Court of the United States has repeatedly held to be a fair return for regulated utilities.

It is an inescapable conclusion that the present unfavorable financial position of the railroads, and the serious shortage in freight transportation facilities now prevailing, are the inevitable consequence of a quarter of a century's failure of the federal government to carry out what it explicitly declared, in the Transportation Act passed by Congress in 1920, to be the future national policy with respect to transportation. That policy was one of so treating all carriers as to enable them to keep in full strength and vigor.

Accepting the government policy in good faith, the railways made huge expenditures during the previous post-war period for improvements and the expansion of facilities, and were no small factor in bringing about the prosperity that prevailed in the country throughout the Twenties, but, as pointed out in the lead editorial of the Railway Age of March 1, the government did not keep faith—every branch of it exerting any influence on the development of transportation persistently and consistently failing or refusing to give effect to the policy then made insofar as it applied to the railways.

Obviously, there must be a change in this situation. The government should reaffirm the broad principles of the Transportation Act of 1920, and the Interstate Commerce Commission should be called upon to carry out these principles. Such is imperative, not from the standpoint of the railroads, as such, but more important, from the standpoint of the good of the country as a whole, and that of the millions of people who, directly or indirectly, depend upon the railroads.

Roadbed Grouting—

Research Showing How It Works

MANY railroads are now following the practice of injecting grout into soft places in the roadbed for the purpose of stabilizing them, and agreement is general that the procedure results in at least some improvement in practically every instance where it is used. An interesting aspect of this situation is that many persons, while acknowledging the benefits obtained, are free to admit that they are not exactly certain how the grout acts to bring about the improvements noted.

One of these is Ralph B. Peck, research associate professor of soil mechanics at the University of Illinois, who is actively associated with the investigation of methods of roadbed stabilization that is now being made under the auspices of the Committee on Roadway and Ballast of the American Railway Engineering Association. In an address before the recent annual meeting of the association at Chicago, Prof. Peck said that, without exception, soft spots and ballast pockets seem to be underlain by plastic clay subgrades and that, in his opinion, the trouble may be started by a very small amount of water gaining access to the zone of contact between the clay and the ballast and forming a thin layer of soupy clay.

Regarding the grouting of roadbed, Prof. Peck said there seems to be little doubt that the grout is distributed in more or less flat seams and that many of these are likely to be located on top of the clay at the bottom of the ballast. "We can at least hazard a guess," he said, "that one action of the grout is to prevent mixing of the water and the clay at the boundary between the ballast and the subgrade." He added: "We do not know whether this is the most important function of the grout. It may improve the roadbed in other ways, possibly by chemical action,"

Thus, it appears that, as this investigation progresses, some of the theories that were developed originally to explain the action of grout may have to be revised.

Asphalt Ballast—

Is Effective Through Station Areas

"SOMETHING new has been added" could well have been the title of the article that begins on the opposite page, describing how the New York Central solved a serious track-maintenance problem at its station at South Bend, Ind. For years many railroads have been installing butt-welded rails in their tracks at certain stations and at other special locations where pumping joints are a particular problem. Adequate drainage has also long been recognized as a necessary concomitant to economical track maintenance at such locations, although the conditions prevailing are frequently such that the problem of assuring proper drainage is difficult to solve.

What is significant about the South Bend installation is that these two recognized methods of reducing track maintenance costs at stations have been used in combination with a newcomer—asphalt-coated ballast. To be sure, a few previous installations of such ballast had been made but, so far as is known, only for test purposes. One of these is the New York Central's own test in one of the main tracks at its Bryan (Ohio) station.

There comes a time in the testing of every new departure from standard practice when a decision must be made as to whether it is to be adopted or rejected. The installation at Bryan has now been in service about eight years and reports are that it has given highly satisfactory results. The asphalt-coated ballast at South Bend was installed in 1945 and the railroad reports that, as a result, the amount of maintenance attention required by the station tracks at this point, which formerly was excessive, has been greatly reduced.

On the basis of these results, asphalt-coated ballast, particularly when used in combination with butt-welded rail and an effiicent drainage system, appears to comprise an answer to the problem presented by excessive track-maintenance costs through station areas. Other railroads can hardly afford to disregard this new solution to an old problem, at least without first considering it carefully.

The Passenger Mains at South Bend After the Asphalt Ballast Had Been Installed

Asphalt Ballast Welded Rails Good Drainage

Solve This Station-Track Problem

Because of the peculiar conditions that frequently prevail in station areas, particularly the difficulty of maintaining effective drainage, track-maintenance costs at such locations are often excessive. In an effort to find a solution to this problem the New York Central System installed a test section of asphalt-coated ballast at a station in 1939. The results were so promising that a further installation was made in 1945, this one at South Bend, Ind., in which supplementary corrective measures included continuous butt-welded rails and an efficient drainage system.

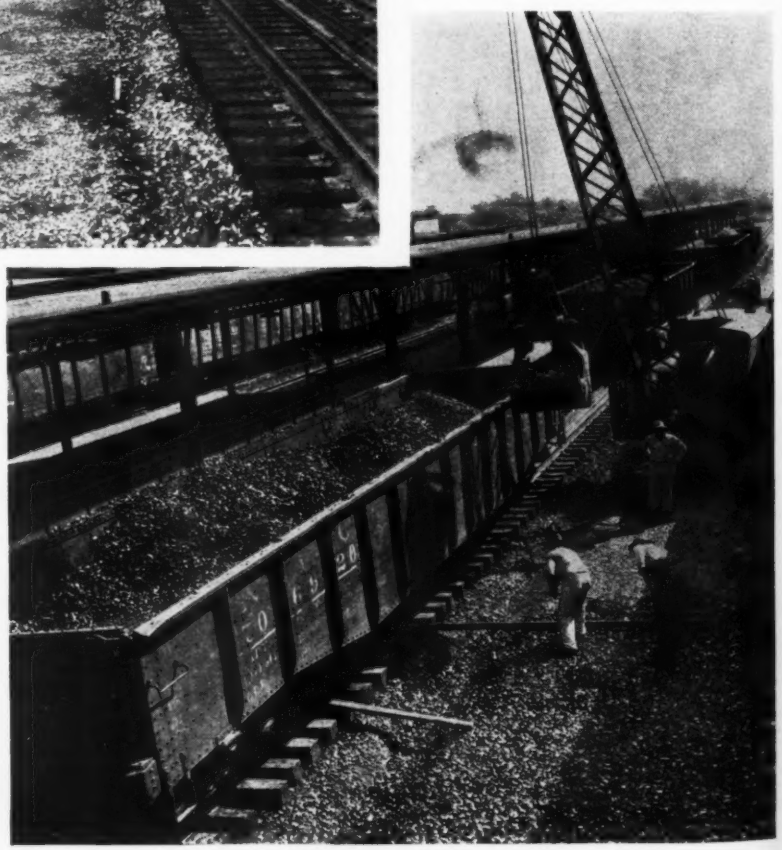
By JOHN R. SCOFIELD
Division Engineer
New York Central System
Chicago

MAINTENANCE work required on the two main passenger tracks of the New York Central System through the station area at South Bend, Ind., has been substantially reduced as the result of a project that involved a combination of measures including the installation of asphalt-coated ballast, the laying of continuous butt-welded rails and the provision of a drainage system for disposing of surface water. This installation has now been in service for about 18 months, having been carried out in September, 1945, and the results obtained, in the form of reduced maintenance costs, have been highly satisfactory.

The problem presented by the excessive cost of track maintenance in station areas has been under careful consideration on the New York Central System for some time. It is recognized that economical track maintenance at such locations requires an efficient drainage system, but that proper drainage is difficult to maintain through station areas because of the peculiar conditions that frequently prevail at such locations. Among these is the fact that the locomotive sand, which is applied in considerable amounts, tends to fill the ballast voids and thereby stops the seepage of water through the ballast. Also, the mixture of sand and stone ballast, in the presence of drippings from locomotives and cars, tends to cement itself into an impervious layer. Thus, with drainage blocked, a muddy condition develops which creates a difficult track-main-

Above—The Plant Where the Ballast and Emulsified Asphalt Were Mixed. Below—Preparatory Work on Each of the Station Tracks Included the Excavation of the Roadbed to a Depth of 12 In. Below the Ties

Right—Unloading and Spreading the First Course of the Asphalt-Ballast Mixture, Which Was 9½ In. in Depth



tenance problem, especially at the joints, where mud, pumped up from the subgrade, was troublesome.

This was the situation that prevailed at South Bend before the corrective work was done. The layout through the station area at this point embodies eight tracks, including two passenger mains, two auxiliary passenger tracks, three freight mains and a siding, all carried on a sand fill supported between concrete retaining walls. The two passenger mains are situated between two concrete island platforms, each 1200 ft. long, with the auxiliary passenger mains lying along the opposite sides of these platforms. At this location, due to the factors mentioned above, the two main tracks between the platforms required almost continuous attention by the maintenance forces to keep them in satisfactory condition.

Method Already Tested

For a number of years the New York Central System has been giving careful consideration to the possibilities of correcting bad track conditions in station areas by using ballast coated with emulsified asphalt, the reasoning being that such ballast would be impervious to water and yet could be worked when necessary. As early as 1939 a test installation of such ballast was made in a 600-ft. length of the company's high-speed eastbound main track at Bryan, Ohio. The performance of this test section has been carefully observed by the railroad and by a subcommittee of the Committee on Roadway and Ballast of the American Railway Engineering Association, and the results of these observations have been recorded by the committee in its annual reports to the association. In a report that was made to the convention in 1943, the committee observed that "the track does not heave due to frost; the seal coat sheds water readily, retains foreign matter and prevents it from getting into the ballast. The track in the test section rides

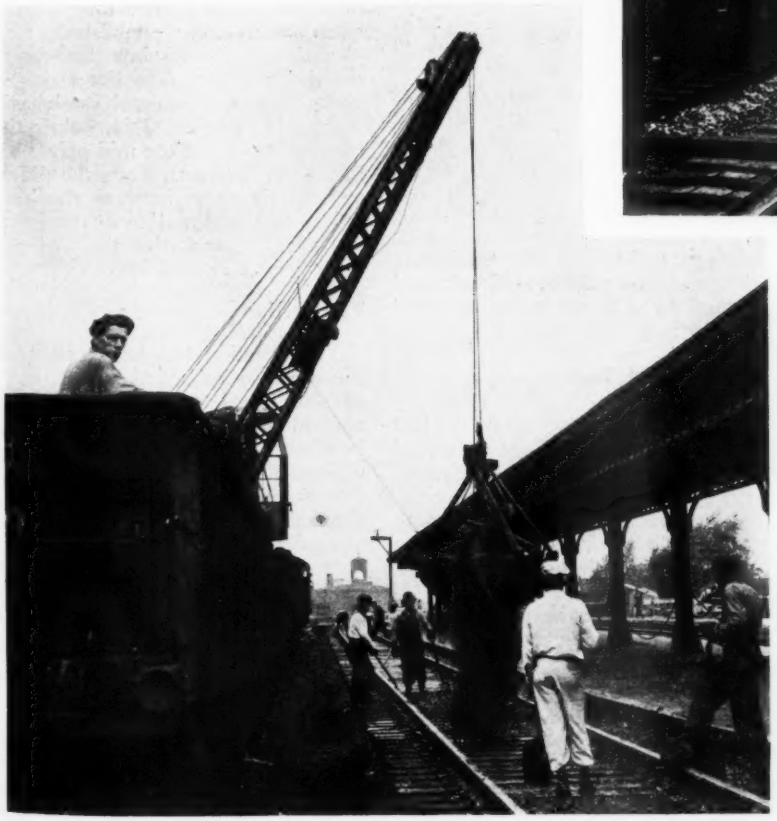
well, remains in good line and surface and continues to give satisfactory results with a minimum of expenditure."

Based on the results of the test at Bryan, it was decided to install asphalt-coated ballast in the two main passenger tracks at South Bend for the approximate lengths of the island platforms, employing such refinements as were indicated by experience with the Bryan test. As additional measures to reduce maintenance costs it was decided to eliminate practically all joints in the two tracks at the station by installing continuous butt-welded rails and to provide efficient surface drainage.

In preparation for doing the work an arrangement was made with a contractor to provide a one-cubic-yard Koehring paver for mixing the ballast and asphalt, the latter consisting of Texaco No. 23 emulsified asphalt. The paver was placed on an elevated dirt ramp so that, after being mixed, the asphalt-coated ballast could be discharged directly into gondola cars on an adjacent track. The mixing plant was located about five miles by rail from the site of the work, and the cars containing the mixture of asphalt and ballast were hauled several at a time to the station location by a switch engine.

To permit the work on the two main passenger tracks to be carried out without interference from traffic, these tracks were taken out of service while the work was under way and all traffic normally carried by them was detoured over the two auxiliary passenger tracks on the opposite sides of the island platforms. Work on the westbound track was done first. After the old rails and ties had been removed from this track, the roadbed, which had become consolidated almost to the hardness of concrete, was excavated to a depth of about 12 in. below the bottoms of the ties, exposing the original sand-fill subgrade. The excavation work was accomplished with the aid of a crawler-mounted dragline outfit, supplemented by a crawler bulldozer, the excavated material being loaded into gondola cars standing on the eastbound track. The subgrade was finished by hand, after

Above—New Creosoted Sawn Ties Were Placed in Both Main Passenger Tracks Throughout the Station Area. Right—Installing a Length of Butt-Welded Rail in One of the Station Tracks. Below—A Seal Coat About 2 In. Thick Was Applied Over the Entire Area Between the Platforms



which it was compacted to the required elevation by a 10-ton roller.

When the subgrade had been fully prepared the asphalt-ballast mixture was unloaded from cars standing on the eastbound track and spread over the subgrade to a depth of 9½ in. The unloading work was done with a crawler crane equipped with a clamshell bucket. The mixture for this part of the ballast section was made in batches of 32 cu. ft., each consisting of two parts of 2-in. stone and one part of ¾-in. graded stone, to which was added an average of 20 gal. of the asphalt emulsion. The crushed stone in the mixture consisted of a limestone that is regularly used on the New York Central System for ballast. Each car held an average of 40 batches, which comprised a volume sufficient to cover approximately 125 lin. ft. of the subgrade, 10 ft. 6 in. in width, to the 9½-in. depth.

The Placing of the Ties Followed Immediately Behind the Unloading and Spreading of the First Course of Asphalt Ballast

Generally, the asphalt ballast was placed within two hours after being mixed. However, on several occasions it was necessary to hold cars of the material under load overnight. When this was done the cars were properly covered, and when they were unloaded the next day, 16 to 20 hrs. after the asphalt and ballast had been mixed, it was found that, except on the surface, there had been no evaporation of water from the asphalt.

As the asphalt-ballast mixture was unloaded it was carefully leveled. Following closely behind this work new creosoted sawed ties were placed in position on the first course of asphalt ballast. Next, the continuous lines of butt-welded rail, consisting of new 127-lb. rail, were placed in position on double-shoulder tie plates and fastened with four spikes for each tie plate, including two line spikes and two hold-down spikes. Each rail was made up of two continuous pieces 429 ft. long and one piece 351 ft. long, making a total length of 1209 ft. Adjoining continuous lengths were joined after laying by conventional six-hole joint bars. Ample provision was made to keep the rails from creeping.

The butt-welds were made at the company's Beech Grove shops at Indianapolis, Ind., by the Oxweld pressure-welding method. After the welding work had been completed the continuous lengths were loaded into strings of open-end gondola cars for transportation to South Bend, a distance of about 170 miles. At the site the rails for the westbound track were unloaded onto the eastbound track and then maneuvered into final position by a Burro crane mounted on a car in a work train.

The Eastward Track

After the westbound track had been rebuilt to the point described above, the procedure was repeated with the eastbound track, using the westbound for loading and unloading material. In the next step the cribs between the ties in both tracks were partially filled with a mixture of ¾-in. graded stone ballast and asphalt emulsion. Each 32-cu. ft. batch of this mixture contained 23 gal. of the emulsion. Each track was then surfaced on a one-inch lift, using pneumatic tampers, after which the cribs were filled to about one half their depth with the ¾-in. asphalt ballast.

Next, a seal coat about two inches thick was applied over the entire ballast area between the platforms, including the inter-track space. This coat was composed of a combination of 25 per cent sand and 75 per cent of ¾-in. stone screenings, thoroughly mixed with asphalt emulsion, and was graded to drain surface water to the inter-track space where a drainage system had previously been provided. A final step, taken to assure that no water would penetrate the surface, consisted of applying over the entire ballast surface a brush coat of a rich mix of sand and asphalt emulsion. When this had been completed, and before traffic was restored over the two tracks, the accumulation of emulsion drippings on the running surfaces of the rails was removed with kerosene and wire brushes, after which a coat of fine sand was deposited on the rails by a work-train engine to complete the cleaning and drying action.

The drainage system that was installed as part of this project embodies nine catch basins covered with metal gratings, six of which are located at intervals in the inter-track space. A system of outfall lines connects the catch basins with existing manholes at two street underpasses in the vicinity, which extend under the tracks approximately at the ends of the passenger platforms. To assure rapid run-off of water from the inter-track space, the tops of the catch basins were established at an elevation 16½ in. below the tops of the ties, with the flow line rising in both directions from each catch basin to an elevation of 3 in. below the tops of the ties at the mid-points between catch basins. Thus the difference in elevation between the high points of the flow line in the inter-track space and the tops of the catch basins is 13½ in.

Test Section

The question has been raised on the New York Central System as to whether a seal coat of asphalt ballast applied over untreated ballast would be effective in overcoming the track-maintenance difficulties ordinarily encountered with station tracks. To determine the answer to this question, short sections of the two main passenger tracks beyond the limits of the island platforms at South Bend were completely reconstructed as part of this project, using a bottom course of regular stone ballast, with no asphalt emulsion added. This untreated ballast was finished to a level two inches below that of the railroad's standard ballast section, after which a two-inch seal coat was applied, which was similar to the

seal coat that was placed on the asphalt-ballasted section. The trackage treated in this manner extends a distance of about 220 ft. from each end of the asphalt-ballast section.

In October, 1946, more than a year after the asphalt-ballast track was installed at South Bend, repairs were made by tamping the track with pneumatic tampers at loose ties and elsewhere as necessary to bring low places back to the original grade. Inequalities in line were also corrected. Additional asphalt-coated screenings were applied where necessary after liquid asphalt had been applied around the ties for sealing purposes. A final seal coat of fine stone chips mixed with cut-back asphalt was then applied over the entire area between the station platforms. A cut-back asphalt was used for this seal coat because it was found to be more resistive to drippings from locomotives and cars than the asphalt emulsion. At the time these repairs were made a small test section was established involving a seal coat of roofing compound, the purpose being to determine the comparative effectiveness of this compound and the cut-back asphalt for the seal coat.

Little Work Required

The combination of asphalt ballast, welded rail and good drainage have produced track that requires very little maintenance. In fact, the only attention that the asphalt track has required, other than that mentioned above, has been for one man occasionally to pick up debris and trash and to remove piles of sand left by locomotives. This man has also applied liquid asphalt to places where steam drippings have cut through the original asphalt.

All of the work involved in installing the asphalt-ballast track at South Bend was performed by company forces except the mixing of the asphalt and ballast, which was done under contract. The work was carried out under the general supervision of F. J. Jerome, then chief engineer of the New York Central System, Lines West of Buffalo. The writer was in direct charge of the work in the field.

Left—Heating an Eyebar With a Three-Tip Torch in Preparation for Shortening it. Center—Upsetting an Eyebar by Tightening the Adjusting Nuts at the Ends of the Tension Rods. Right—Testing the Temperature of an Eyebar with a Pyrometer

Shortening Eyebars with the Oxyacetylene Flame

AN increasing number of railroad truss bridges of the pin-connected type with eyebar tension members are being repaired by the flame-shortening method, as allustrated in these views. The eye-bars of the diagonal members and bottom chords in these structures frequently become loose as the result of wear on the pins and on the bearing surfaces of the eyebar heads. When this occurs, these members do not carry their share of the load, and the bridge, in consequence, becomes weakened. In the flame-shortening method of repairing such structures, which was described in detail in the July, 1945, issue of Railway Engineering and Maintenance, *a restricted area of the member is heated by means of oxyacetylene torches and an axial upsetting pressure is applied to the member by means of a yoke clamped to the member on each side of the section being heated.*

A typical yoke for applying the upsetting pressure to the bridge member consists of two round steel bars, about one inch in diameter and threaded at both ends, and two pairs of transverse steel clamping plates. One of the pairs of plates is clamped to the bridge member on each side of the area to be heated, with rough-surfaced shims being placed between the bridge member and the plates to prevent slipping. The tension rods extend between and beyond each pair of plates. Heavy plate washers and nuts on the ends of each rod complete the yoke assembly.

With the yoke in position, heat is applied to both sides of the eyebar with the torches. The length heated varies from 2 to 12 in., depending on the sectional dimensions of the member. After the steel is heated to a cherry red or to a temperature of 1600 to 1800 deg. F., the nuts are tightened to upset the metal of the heated area, thus shortening the member.

From 25 to 40 min. are usually required for this work for each member, including the time needed to cool the member sufficiently to prevent it from restretching under the strain of a train movement.

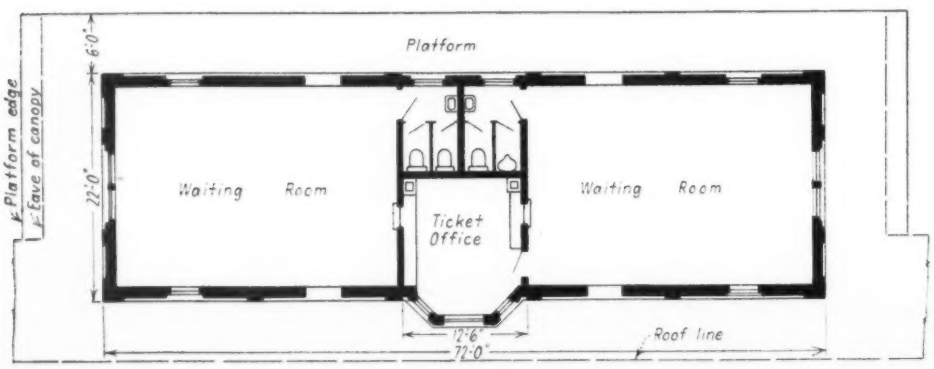
When repairing bridges with this method an attempt is usually made to leave each member with a strain approximately equivalent to its calculated dead-load stress. One means of accomplishing this is to shrink each member by successive applications of the heating process until it vibrates the desired number of cycles per minute. The proper frequency of vibration depends upon the length and cross section of the member and its calculated dead-load stress. We are indebted to the Air Reduction Sales Company, New York, for the information and photographs presented in this article.

This View of the North Western Station at Marinette, Wis., Was Taken Soon After Completion of the Recent Improvements

This Small Station Gets All Dressed Up

RECOGNIZING that "first impressions are lasting," the Chicago & North Western has under way a program of modernizing a number of passenger stations in the smaller cities on its lines. The most recently completed project of this type was carried out at Marinette, Wis., a city of approximately 15,000 population, located on the road's Peninsula division in northern Wisconsin. Here, a 58-year-old station, completely outmoded in every respect, has undergone a thorough face lifting, at a cost approximating $18,000, with the result that it now presents a highly pleasing appearance, both inside and out.

In the modernizing work, the exterior of the building was given a more up-to-date appearance by removing a useless cupola above the roof line and by making other changes to the roof and to the platform canopies, as will be explained later. The interior of the station, formerly embodying two separate waiting rooms, was completely revamped to form a single large waiting room with the ticket office and toilet rooms relocated at opposite ends of the building, and was then completely refinished and redecorated. An attractive new ticket window and a new ticket counter, embodying several unusual features of design and treat-



Before—As Shown in This Floor Plan the Station Originally Had Two Separate Waiting Rooms

Without altering the basic structural features of the building, the Chicago & North Western recently converted its passenger station at Marinette, Wis., previously a drab and unattractive structure, into one that is highly pleasing in appearance and modern in every respect. The work, which is described in detail in this article, included the streamlining of the exterior, and the complete renovation of the interior.

ment, add to the modern appearance of the remodeled waiting room.

As built originally, the station at Marinette was a single-story structure, 22 ft. by 72 ft., extending in a north-south direction, parallel with the tracks on their east side. On the exterior a belt course of cut stone extended from the ground line to the window level, above which the walls were of brick. A bay window 12 ft. wide projected from the center of the track side of the building. The roof, of the gabled type, was covered with cedar shingles, and embodied a cupola, octagonal in shape and topped by a steeple, which projected above the station immediately over the bay window. An overhanging canopy projected from each end wall above the window level. At the north end the canopy and the roof overhang on the track side joined an umbrella-type canopy which extended for 30 ft. along the platform. A similar arrangement existed at the south end but here the canopy extended 25 ft. to a separate building containing the baggage room, and for 30 ft. beyond. The baggage-room building, 16 ft. by 16 ft., is of the same general construction as the station.

Original Interior

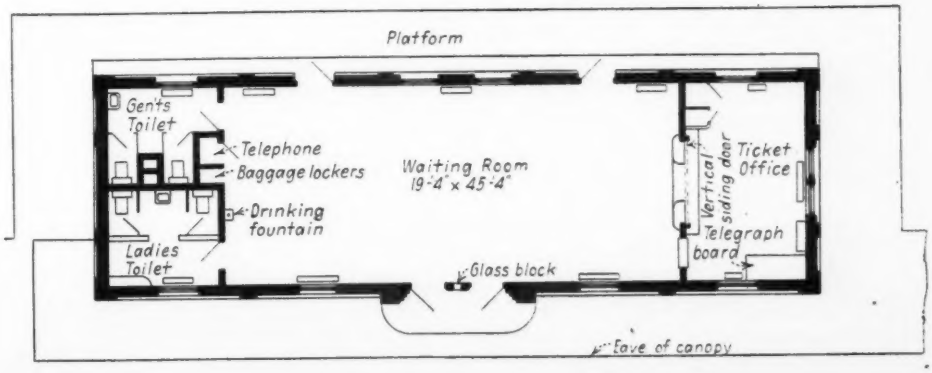
The interior of the station originally contained a single waiting room, into which the ticket office, 13 ft. by 15 ft., projected from the west or track side. Later, toilet rooms were added in the space between the ticket office and the east wall, dividing the interior into two entirely separate waiting rooms. Entrance to each of the waiting rooms was by means of two doors, one on each side of the building. The floors were of maple, and the walls had wood wainscoting with corrugated galvanized iron above. The ceilings, 12 ft. 6 in. high, were also of galvanized iron. Each waiting room was heated by a coal stove and was illuminated by shaded droplights.

Thus, as constituted before the recent work was carried out, the station was entirely out of keeping with the modern trains being operated over the Peninsula division, such as the Peninsular and Valley "400s." Recognizing this, the North Western selected it as one of the first stations to be improved following the close of the war. Material and labor shortages, and also a fire, impeded the progress of the work, which was begun in the latter part of 1945. Finally completed, the renovated station was placed in service in September, 1946, and has been enthusiastically approved by the townspeople.

Exterior Changes

Important among the exterior improvements was the streamlining of the roof, which was accomplished by removing the cupola, the end canopies, and the wide overhang at the rear of the building, the overhang being replaced by a box cornice. At the same time the platform canopy north of the station was removed, as was the canopy extending south of the baggage building. The roof of the station, and that of the baggage building, were then covered with blended green and brown, slate-surfaced asphalt shingles, which were

General View of the Interior of the Remodeled Station



After—A Single Large Waiting Room Was Created and the Other Facilities Were Relocated

applied over a layer of tarred felt covering the existing roof boards.

Another important structural alteration to the exterior was the removal of the bay window on the track side and the provision of a new entrance in its place. The new entrance embodies two single doors separated by a glass-block pilaster, 36 in. wide, the top of which joins a continuous glass-block lintel, 32 in. high, above the doors. No longer needed, the two old doors in the track-side wall were partly bricked up and new windows were installed in place of them. Also, the one window in the north wall of the station was bricked up, after which the exterior masonry of the station and the baggage building was cleaned.

Interior Improvements

Within the interior of the station, the existing ticket office and toilet facilities were removed and new ones were installed, the ticket office being placed at the south end of the building and the toilet rooms at the opposite end. Thus, the two former waiting rooms were merged into one, which is 19 ft. by 45 ft. in plan.

In refinishing the interior, the old wainscoting, of dressed and matched wood, was replaced by ¾-in. quartered white-oak veneer, applied with the grain vertical, to a height of 7 ft. 2 in. The corrugated metal on the walls and ceiling was removed and replaced with plaster. The existing floor of the waiting room was covered with a magnesite fill to form a base on which a Johns-Manville asphalt-tile wearing surface was laid. The tile is arranged in an attractive geometric pattern of alternating squares of gray and mottled black, with the latter squares circumscribing smaller squares of gray.

The Ticket Window

The ticket office is 12 ft. by 19 ft. in plan and is separated from the waiting room by a partition wall. In the center of this wall are the new ticket window and counter. The counter, faced with burled oak veneer, is 10 ft. long and projects about 2 ft. into the waiting room. To give it a streamlined apparance its ends are curved backward to meet the wall. At the center of the counter a section 3½ ft. wide is depressed 12 in. below the top to form the deal plate, which is covered with black cigarette-proof Formica. The edges of the depressed portion of the counter are curved to harmonize with the general streamlined appearance of the counter as a whole.

Above the counter, a 4-ft. by 8-ft. opening forms the ticket window. This is fitted with a vertical-sliding door which is raised when the office is open for the sale of tickets. The door is faced with white-oak veneer to match the wainscoting, and contains a 24-in. square opening at the center, flanked by two smaller circular openings, all of which are glazed with plate glass. At the right of the counter a Dutch door provides access to the ticket office. The upper section of this door has a 24-in. circular window, which is matched at the left of the counter by a 24-in., circular, glass-covered bulletin board of black felt, with removable letters. All other doors except those to the toilet rooms, have similar circular windows of peach-colored glass.

The ticket office is equipped with specially-built cabinets for tickets and rubber stamps, and for the filing of records. One corner of the office is given over to the telegraph operator and is fitted with a specially-built desk with a cigarette-proof top.

The toilet facilities, now located across the north end of the building, are entered directly from the waiting room. The ladies' toilet room is 10 ft. by 11 ft., while that for men was made somewhat smaller to provide space for a telephone booth and a single vertical bank of parcel lockers. The flooring in the toilet rooms is of ceramic tile, the walls and ceilings are of plaster, and the fixtures are of the latest type. The ladies' room includes a vanity and large wall mirror.

A thermostatically-controlled, hand-fired, circulating hot-water heating system replaces the stoves formerly in use. The boiler for this plant is located in the baggage building, and the pipe lines to the station are buried in the ground in a glazed-tile conduit. Five convector-type radiators are provided in the main waiting room, two in the ticket office, and one in each of the toilet rooms.

Lighting in the waiting room is entirely of the fluorescent type, consisting of five groups of lights, each containing three 48-in. fixtures placed end to end. These are placed transversely and are recessed into the ceiling. Similar fixtures are installed in the ticket office. Incandescent ceiling fixtures are provided in each toilet room, together with wall fixtures above the lavatory mirrors. In the ladies' room a fluorescent wall light is located immediately above the vanity mirror.

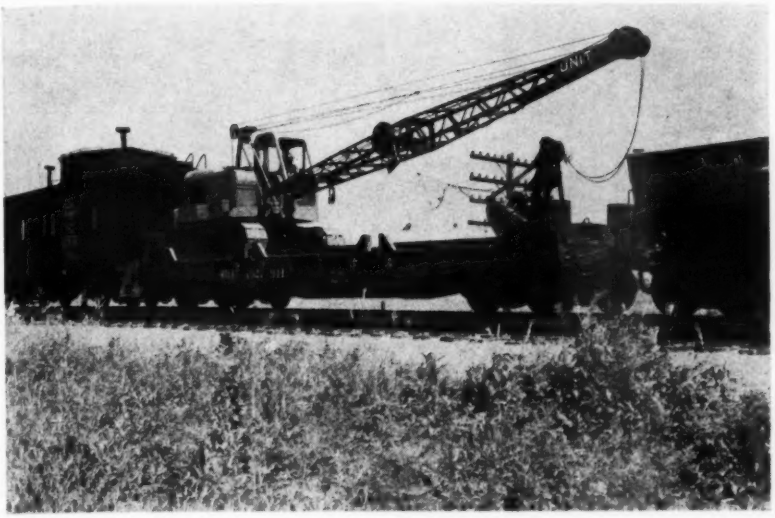
Decoration

The interior decoration of the station is designed to accentuate the modern appearance. The doors throughout the station are new and all of the interior woodwork, such as the wainscoting, trim, doors, ticket counter and 'phone booths, is finished with three coats of clear varnish rubbed to a semi-gloss. Above the wainscoting, the walls of the waiting room, as well as those in the ticket office, are painted Wedgewood blue enamel and the ceilings of these rooms are colored in peach blossom enamel. The walls of the toilet rooms are Caribbean blue to the tops of the doors, above which they are a Swedish red. The ceilings of these rooms are platinum gray. Black Formica kick-plates are provided on all doors. The convector-type covers of the radiators are painted to match the woodwork. Glass-block panels, 32 in. in height, are installed above the doors in the rear of the station to harmonize with the lintel above the track-side entrance.

New waiting-room furniture, consisting of chromium-plated tubular chairs and sofas of several designs, and in sufficient number to seat 35 persons, is installed in the station. These are upholstered and finished in a two-tone, imitation-leather design.

The modernization of the Marinette station was carried out under the general direction of E. C. Vandenburgh, chief engineer of the C.&N.W., with the design work being performed under the direct supervision of L. C. Winkelhaus, architectural engineer. The field work was supervised by L. C. Smith, division engineer of the Peninsula division, Escanaba, Mich.

This Poster, No. 282, Constitutes Part of the "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

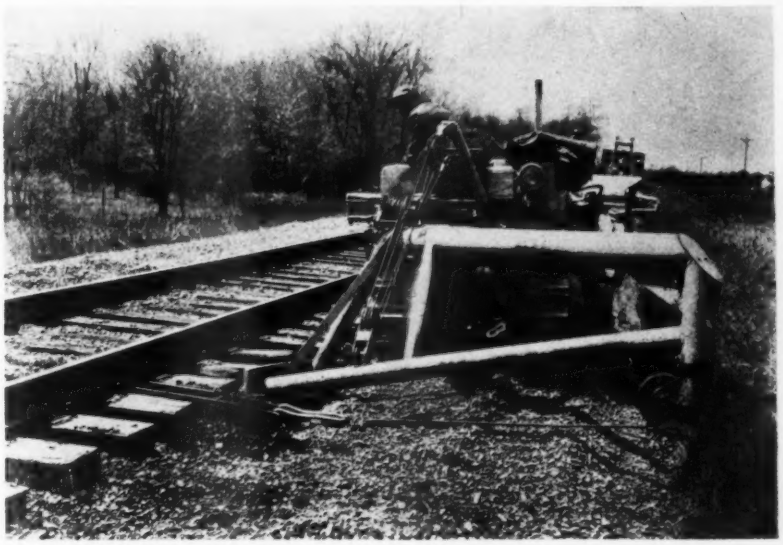


Adapts Flat Car for Mounting Crawler Crane

THE Chicago, Milwaukee, St. Paul & Pacific has redesigned one of its flat cars to form a carrier for a new Unit convertible crawler crane as shown here. Guide angles were laid along the deck of the car to form a runway which permits the crane to travel the full length of the car without danger of running off. Another change was the provision of four pairs of steel chocks along each side—at each end and at each of the third points—to divide the car into three sections. Crossbeam dividers may be placed across the car and fitted into the openings between the chocks to act as stabilizers for the machine while it is in operation or when the car is in motion. By changing the position of the crossbeams as the work progresses, three operating positions are afforded the crane. The crane used on the car has a capacity of 10 tons as a crane, and 3/4 yd. when used as an excavator.

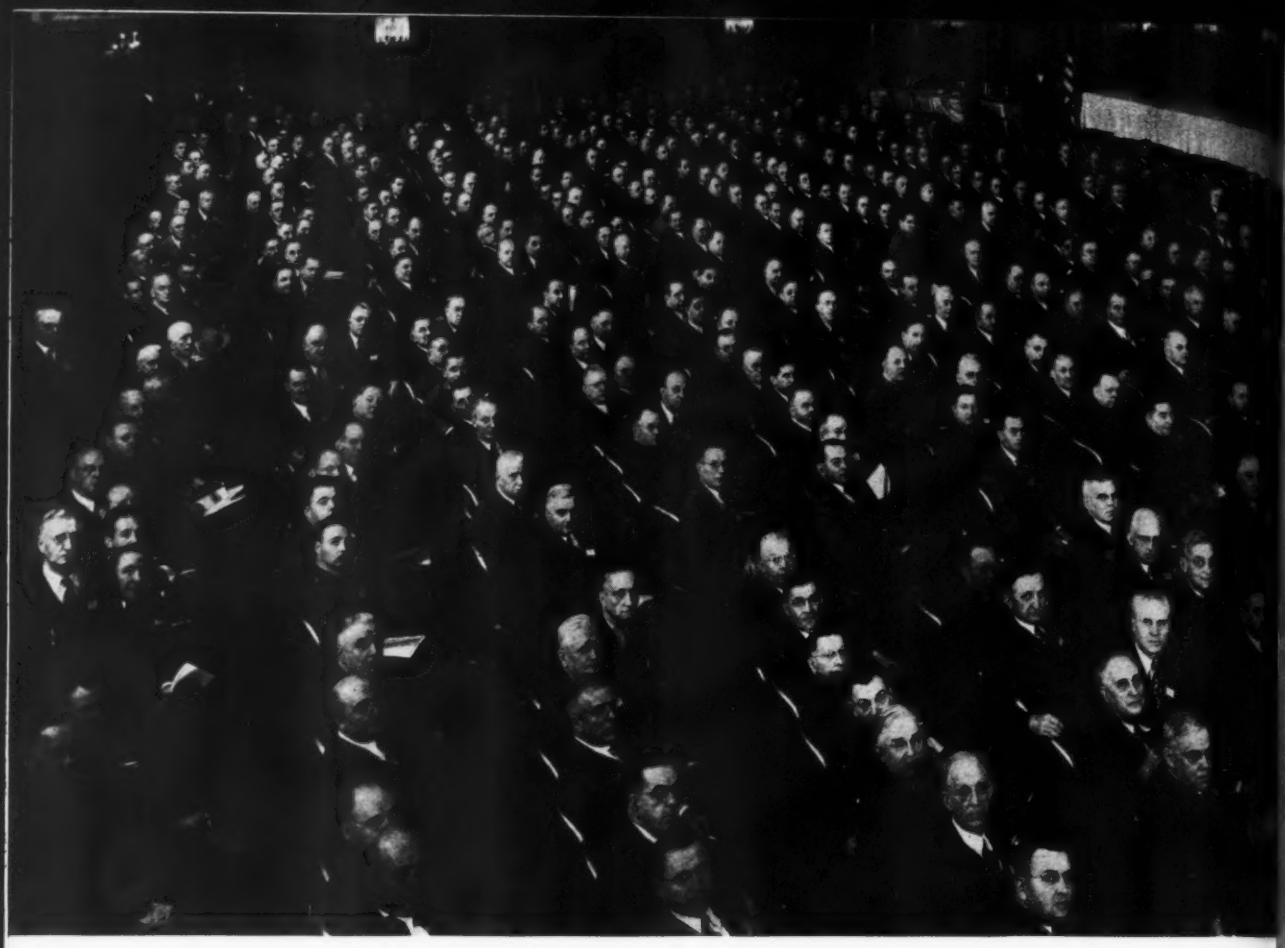
Tractor Attachment Facilitates Cribbing Work

THE operation of Pettibone Mulliken cribbing devices on the Pere Marquette is now being facilitated by an improved Hyster rear-end attachment for use on the crawler tractors employed to pull these devices through the cribs. Shown in operation here, mounted on the rear of a Caterpillar tractor, the device is so designed that the tractor can operate directly on the shoulder at the ends of the ties. A shoe, mounted at the end of the lower arm, bears against the ends of the ties and stabilizes the tractor during the pulling operation. See Railway Engineering and Maintenance *for November, 1945, for a detailed description of this method of cribbing and the equipment employed, which includes a rooter for loosening the ballast and a drag bucket for removing it.*



Fighting Snow Drifts With a Jordan Spreader

EARLY in March a heavy snowstorm raged over Western New York, piling up huge drifts that interfered seriously with train operation. On some lines service was interrupted for several days, and to clear them as quickly as possible it was necessary to call out every available piece of snow-fighting equipment. Shown in this view is a Jordan Spreader, equipped as a snow plow, fighting its way through drifts on the Buffalo branch of the Erie, about two miles west of Warsaw, N. Y.



A Candid Camera Visits the A

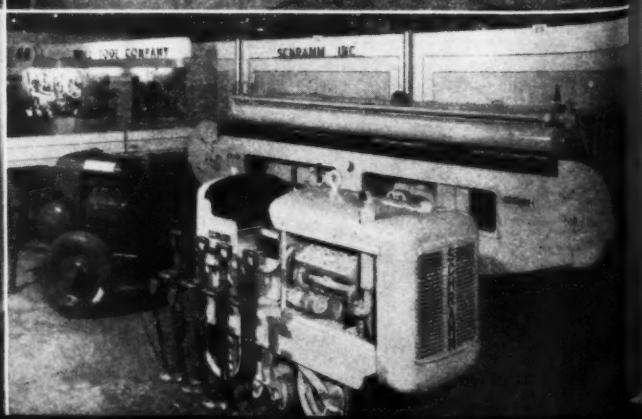
THE FORTY-SIXTH annual meeting of the American Railway Engineering Association was held at the Palmer House, Chicago, on March 18-20. Coincident with this meeting the National Railway Appliances Association held its thirty-second annual exhibit at the Coliseum. With a total of 101 companies participating, this exhibit was the most comprehensive to be held by the N.R.A.A. in about 20 years, and those present at the A.R.E.A. meeting spent much time inspecting the machines, devices and materials on display. Views of some of the exhibits are shown on following pages.

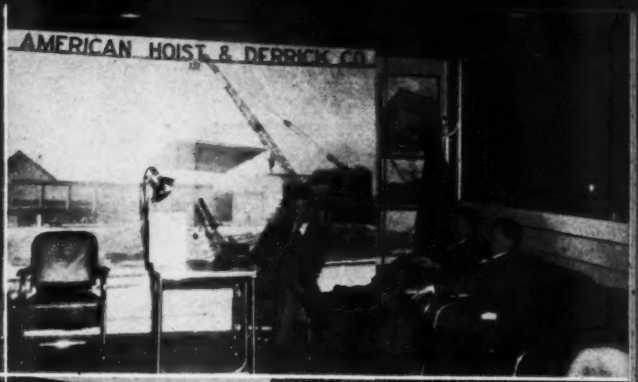
In spite of their preoccupation with the affairs of the association and the exhibit the members and guests attending the convention found time to renew acquaintances and talk shop. Shown on these two pages are some candid "shots" of these informal groups "in session." Other photographs taken at the convention and the exhibit were published in the Railway Age of March 29.

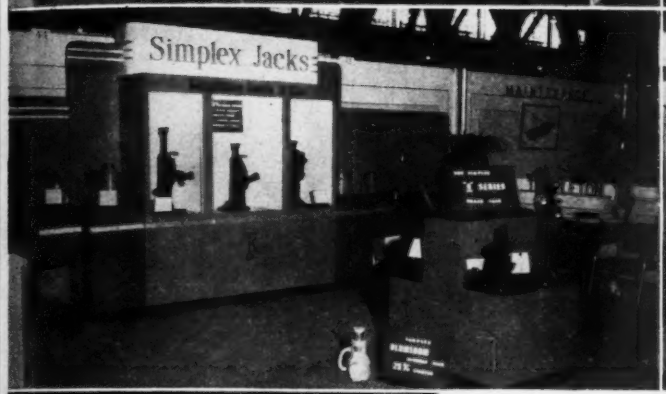
A.R.E.A. Meeting

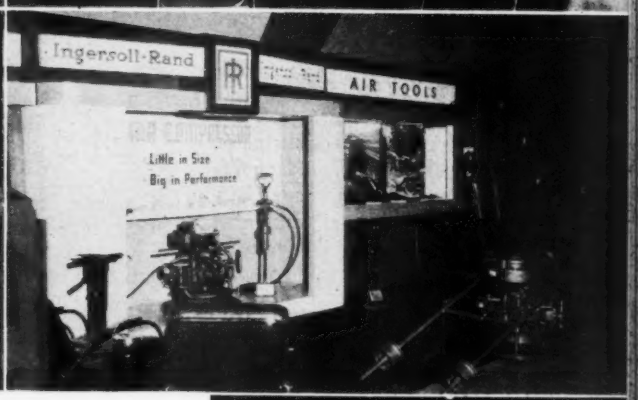
Reading from left to right—(1) President J. B. Akers (Sou.) presiding at the opening session. (2) W. S. Hanley (St.L.S.W.), C. R. Knowles (I.C., retired), E. F. Salisbury (K.C.S.; L.&A.). (3) L. J. White (Conley Frog & Switch Co.), C. M. Chumley (I.C.), O. H. Wainscott (I.C.). (4) F. M. Masters (Modjeski & Masters), G. L. Staley (M-K-T), R. Owen (M.P.). (5) S. R. Young (A.&W.P.), W. A. Fisher (Bernuth, Lembcke Co.), L. S. Jeffords (A.C.L.), C. S. Sanderson (A.C.L.). (6) C. H. Blackman (L.&N.), J. E. Teal (C.&O.), D. C. Teal (C.&O.), L. L. Adams (L.&N.). (7) A. E. Botts (C.&O.), J. P. Walton (Penna.), A. B. Chapman (C.M.St.P.&P.), F. R. Smith (Union R.R.), A. N. Laird (G.T.W.). (8) J. P. Hiltz (D.L.&W.), R. E. Patterson (L.V.), G. A. Phillips (D.L.&W.), I. H. Schram (Erie), F. W. Biltz (Reading). (9) Walter Leaf (D.&R.G.W.), A. N. Laird, J. A. Lahmer (M.P.), G. E. Robinson (N.Y.C.). Top Left—The convention in session in the Hotel's Grand Ballroom.

A Few Typical Scenes at the N.R.A.A. Exhibit at the Coliseum

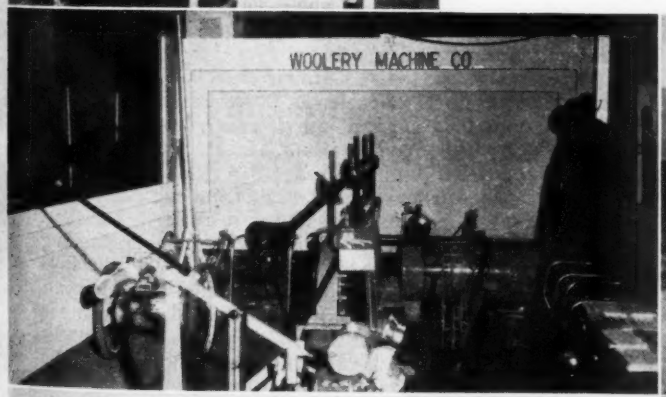








During the A.R.E.A. Convention in March a total of 101 member companies of the National Railway Appliances Association displayed their products in that association's thirty-second annual exhibition. These views, taken at random, are illustrative of the general character of the exhibits presented.



No. 12 of a Series

In this installment of the series on the selection, care and operation of track motor cars, the author deals with the many factors in the care of motor cars which should be apparent to everyone who operates a car, but which are often neglected through ignorance, carelessness or oversight. Some of the factors covered are the necessity for frequent inspection, cleanliness, keeping bolts tight, care of various parts, handling the car off and on the track, overloading, speeding, loading for shipment, and rules to be observed in the care of motor cars.

Care of Motor Cars

By G. R. WESTCOTT
Assistant Engineer
Missouri Pacific Lines
St. Louis, Mo.

THE NECESSITY for the proper care of motor cars at all times should be so apparent to everyone who operates a motor car that it should hardly be necessary to call attention to it; yet neglect to take the proper care of motor cars is not at all uncommon. This may be due either to ignorance or to indifference.

Most directly, three agencies are involved in caring for a motor car. These are: (a) the user of the car, who may be the operator or the foreman of a gang; (b) the field maintainer; and (c) the supervisor. Complete understanding and cooperation among these three employees are necessary if full service is to be received from the car.

If the user is ignorant of what is required in the handling of the car, the fault may not be his alone. As a workman, he should recognize generally the difference between proper and improper treatment. However, he may lack training in the care of machinery. He may also have his mind so fixed on other work for which he is responsible that he overlooks the important part the car plays in carrying out that work. He may need instruction in many particulars in the handling of the car. The responsibility for such instruction may rest on the field maintainer, or on the supervisor, or on both, depending on the character of the organization on any particular railroad.

The field maintainer understands the relation between the care the car receives and the service it renders. Any lack of care in handling the car is at once apparent to him, and he knows in what ways greater care should be given in order that good service may be received. Frequently, however, he is without authority to enforce the changes in handling that he sees are necessary, and, therefore, must have the full support of the supervisor if correction is to be made.

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Supervisor's Attitude Important

The attitude of the supervisor is of the greatest importance. Unless he realizes the importance of care in handling the car, and makes known to the user that it is not to be neglected, best results cannot be expected. Often he may not be qualified to indicate to the user some of the details that should be observed; but he should insist on regular and careful lubrication, frequent inspection, cleanliness, careful handling in setting the car on and off the track, and the avoidance of overloading. Always, he should insist that the user accept and observe the advice and instructions given by the maintainer. If he believes any such instructions are not good, he should reach an understanding with the maintainer, and thus avoid influencing the user to question or ignore the maintainer's advice. By close co-operation between the supervisor and the maintainer, ignorance on the part of the user as to what constitutes proper care can be eliminated.

Remedy For Indifference

Lack of care, however, may be due to indifference on the part of the user. There is but one remedy for that—insistence by the supervisor that the rules and instructions be observed. The handling of the car may be fully covered by instructions and rules, but an indifferent user will observe them only if he knows that his supervisor requires it.

More remotely, other departments, particularly the purchasing and stores, bear a responsibility in providing materials promptly, and of the right sort, for the maintenance and lubrication of the car. Often the manner in which this responsibility is met is influenced by the attitude of the user, the maintainer and the supervisor. If these three are indifferent as to the materials provided, accepting them without question as to quality or delay in furnishing, there is little chance that the condition will be corrected. If the materials furnished are not suitable, or if there is undue delay in receiving them, report to this effect should be made promptly. It is important that such a report be complete in its details. For example, a statement is sometimes heard that "the oil we are getting is no good." Such a statement does not furnish any basis for correction. The report should show for what purpose the oil was required, how and when it was ordered, from whom it was received, and in what way or for what reason it was unsatisfactory. Giving complete information will be hedpful in correcting the trouble; merely complaining will not.

Assigned Operator Best

The best service from a motor car is generally received when it is cared for and operated by the same man at all times. If it is a gang car, one man should be assigned regularly to this duty. In selecting such a man, one known to have some mechanical aptitude of the right sort should be chosen. If he has a love for well-cared for, smooth-running machinery, he will be valuable. If, however, his mechanical genius is based on a love for tinkering, it would be better to choose another man.

When a man from the gang is assigned the duty of caring for the car, there should be a clear understanding as to his duties. He should be held responsible for the condition of the car, and the foreman should see that he is relieved of other duties to the extent necessary to permit his giving the car the required attention. If assistance from other members of the gang is required, the foreman should see that such aid is given.

In some cases, small cars are pooled and used by different employees as their needs arise. Such cars are less likely to be well cared for than a car used always by the same man. In this again, the attitude of the supervisor has a large bearing on the way the car is maintained.

Frequent inspection of a motor car

is necessary if long life and trouble-free service are to be secured from it. The user should inspect it daily to see that it is clean, that nuts are tight and that no bolts are missing, that it is well lubricated, that brakes are correctly adjusted, that wheels, axles and bearings are in good condition, and that sufficient fuel of the right kind is in the tank. Any unsatisfactory condition found should be corrected at once, but tinkering should be avoided. If parts or tools required for making the correction are not available, report of the needs should be made promptly to the maintainer or supervisor.

Every 30 days, or oftener if possible, the car should be inspected by the maintainer, together with the user. This inspection should serve as a check against the user's daily inspection. In addition, the adjustments of all parts should be checked, and corrected if necessary. It is important at this time that the user call attention to any unusual or unsatisfactory condition in the operation of the car, so that the cause may be discovered and corrected.

Cleanliness

Keeping a motor car clean is not only good housekeeping, but is of great assistance in making inspection of it. Defects that might be overlooked on a dirty car will be found easily on a car that is kept clean; and provision can be made for correction before a failure in service occurs. Dirt and grease should not be allowed to accumulate anywhere on the car, but it is especially objectionable on the engine and engine accessories. On the wiring, it will destroy the insulation, and on the spark plugs, it may cause shorting. Many ignition failures are due to incrustations of grease and dirt on these parts. Grease on wooden parts creates a distinct fire hazard. It is much easier to keep a car clean than to clean it when dirt has been permitted to accumulate for some time. Therefore, all parts should be wiped off when the daily inspection is made.

At least once a week, a more thorough cleaning should be made. All tools and supplies should be removed and the deck swept clean of dirt and cinders. The less accessible parts should be cleaned at this time and all grease and dirt that will not wipe off readily should be removed by scrubbing. Only those tools and supplies that are to be used should be replaced on the car. Broken tools and miscellaneous scrap should be placed in the scrap pile or other assigned place, and spare parts not needed for immediate use should be left at the tool house.

Neatness should be a part of cleanliness. The canvas cover for the car, when not in use, should be folded neatly, after having been dried out well if it has become wet. Seat pads or clothing used as cushions should be dried out after they have become wet. These things may well be considered of importance, for if the user takes enough interest in the car to keep it neat and clean, it may be assumed reasonably that he will be careful of it in other respects.

Keeping Nuts and Bolts Tight

One very common failure in maintaining a motor car is permitting the nuts on bolts to become loose or to drop off, or the bolts themselves to drop out. Too often, even when the looseness of a nut or the absence of a bolt is very apparent, nothing is done about it. The attitude seems to be that since there are many bolts, those remaining will take over the duties of the missing ones. It is overlooked that each bolt has its own particular duty to perform.

One of two things is likely to result when a bolt fails in its duty. In the first place, the parts, not being held snugly together, will wear rapidly under the vibration of the car. This may be noticed particularly when one or both parts are of wood as, for example, a frame member of a wood-frame car. In the second place, a part may be subjected to unusual strain because of the lack or looseness of a bolt. Bracket flanges are often broken when one of two or more bolts holding them become loose.

Loose frame bolts in wood frame cars are especially troublesome, both because they become loose more often than other bolts through the shrinking and swelling of the wood, and because such frames get out of alinement bodly when the bolts loosen. A car may check correctly for tram while standing, but when running, due to uneven loading, may pull out of alinement and one wheel flange wear rapidly from constant grinding against the rail.

Hub bolts and rivets on steel wheels and hub and rim bolts on wood-center wheels rarely give trouble, but they should be watched and tightened if necessary.

Safety, long life and trouble-free service all demand that bolts be kept tight. It is appropriate to consider some of the means by which this can be done. In wood frames, if carriage bolts are used, they should be provided with head locks to prevent their turning, and washers should be used under the nuts. Nuts of a self-locking type are desirable. Double nutting to prevent loosening is effective, but is not desirable where frequent tightening is required, as in the case of wood parts, since the thin-ended wrench needed for adjusting them is not often available. Lock washers should be used on bolts securing metal parts, or they may be double nutted. With such bolts, if drawn up tight, readjustment is rarely necessary. Frequent checking, and retightening if necessary, is better insurance against loose bolts than any mechanical contrivance.

Stillson wrenches or pliers should not be used for tightening nuts or stud bolts as the use of such tools will round off the corners of the hexagon or square and make it difficult to turn the nut or bolt with any tool. The use of a socket wrench or end wrench of correct size is preferable, but a monkey wrench or other adjustable

A Motor Car Will Give Many Years of Satisfactory Service, Provided It Is Operated Properly, Inspected Regularly and Otherwise Given Adequate Care

wrench may be used if set to the correct opening.

Correct and regular lubrication is of great importance. It has been discussed in detail in an earlier article of this series and is mentioned here only to emphasize the importance of it in the care of the motor car.

Brakes

The power to stop a motor car is quite as important as the power to run it. Brakes, therefore, should be kept in good condition at all times. Brake shoe facings should have full bearing on the wheels, and the toggles should be adjusted so that the brakes on all wheels are applied uniformly. The brake shaft, lever and other parts should be mounted securely, and without lost motion, so there will be no failure in the application of the shoes when the lever is thrown. Brake release springs should be kept in good adjustment to prevent brake shoes from dragging on the wheels. Because of their importance in the operation of the car, brakes should be inspected carefully and any improper conditions corrected.

Wheels, Axles and Bearings

Axles and axle bearings formerly required heavy maintenance. This has been eliminated to a large extent by designs now in use. If the axle does not become bent or sprung from accident or careless handling of the car, and the thrust collars are kept in correct adjustment, these parts may often give trouble-free service for the life of the car.

Wear on wheels due to contact with the rails must be watched closely. On the heavier cars, this wear is most pronounced at the throat of the flange, but on small light cars, heavy tread wear is often observed. There are three conditions that bear on wheel wear. These are: correct gaging, correct tram, and the matching of the drive wheels in size. Of these, correct gaging is, within reasonable limits, of least importance. The recommendation of the A.R.E.A. is that for all cars the gage be the same as called for by A.A.R. rules for rolling stock; that is, 13/16 in. total lateral clearance between wheel flange and rail at the gaging point 5/8 in. below top of rail. Not all railroads follow this practice, however. It is of greater importance that the wheels be in correct tram and alinement and that the drive wheels be matched as to circumference. Failure in either of these particulars is likely to result in undue wheel wear on one or more wheels, due to thrusting against the rail.

A loose wheel, if used, requires constant attention, and frequent renewal of the hub or bushing, or even of the axle. Fortunately, the loose wheel is largely giving way to the differential axle, of which there are now several types available. Regular lubrication is the principal requirement in caring for a differential axle.

Setting On and Off Track

Foremen and motor car operators seldom realize the amount of damage done to a motor car through carelessness in placing it on and off the track at road crossings, set-offs and elsewhere. Rough handling of a car on and off the track damages wheels, axles and axle bearings, distorts the frame, loosens bolts and nuts, and may damage bearings, cylinders and other engine parts. Many motor-car failures laid to the breakage of some part from an "unknown cause" may be traced directly to rough handling when setting the car on or off the track.

The introduction of rail skids on nearly all cars, and of set-off skids on small cars, has tended to decrease the damage to some extent; and the use of extension lifting handles has made it easier to handle cars. However, the advantages of these improvements are offset by increased rail height in many places. Damage in handling on and off the track remains a considerable factor in the maintenance of motor cars.

If a car can be lifted bodily and carried, this method of handling is least likely to result in damage to it. However, this method can rarely be used with any but the smallest cars, as the load is greater than can be carried by the number of men who can get into a position to lift the car and walk with it safely. Wedging lining bars in frame members or wheels to permit more men to assist is very destructive to the car and should not be permitted.

Use Care at Crossings

As has been noted in a previous article in this series, the most common method of removing a car from the track is to turn it crosswise of the track and "roll" it off. If this is done at a road crossing, the principal hazard is that of cramping the wheel flanges in the flangeways of the crossing as the car is turned from its position on the rails. This may result in "sprung" or distorted wheels, and in the case of a car with a very slender axle, in the bending of the axle. If the flangeway is narrow, the front wheels should be set off the rails toward the side to which the car is to be removed before turning the car crosswise of the track. This hazard does not generally exist at well constructed motor car set-offs.

Although the removal of the car in open track, that is, where the space between the rails is not filled, is avoided whenever possible, there are times when this must be done. The hazard to the car in this case is the jolt it gets in rolling over the rail. Insofar as possible the car should be "eased" over, and sudden dropping of even a few inches avoided.

Whenever a motor car is set off, it should rest on reasonably level ground. All wheels should be equally supported, even if this requires blocking; otherwise, the frame may become warped and weakened.

Replacing the car on the track should be done with the same care as is used in removing it. This is not usually an emergency operation, but sometimes the urge to get to the tool house quickly at the close of the day's work may lead to careless handling.

Overloading

A study of motor car loading indicates that, as a rule, no load limit is recognized by track gangs or others. The loading is usually limited to the number of men in the gang and such tools as can be piled on the car, or in rare cases to what the foreman may consider a safe load. As a result, much damage to many cars is due to overloading.

There is no well established rating of motor cars as to the loads that they will carry without damage. As allowance is made in wheel design for the wear to which they are subject, they commonly have a strength considerably in excess of that required for supporting any reasonable load. The size of the frame members, the material of which they are made, and the design of the frame are all involved in its load capacity, and there is no convenient method of evaluating the strength of the frame except by use. For these reasons, the size of the axle has come to be the obvious measure of a car's capacity.

Load Capacities of Motor Cars of Various Types

Class of Car	Size of Axle	Max. Load
One-man	1-3/16 in.	600 lb.
Light inspection	1-3/16 in.	750 lb.
Light section	1-5/16 in.	1,200 lb.
Standard section	1-7/16 in.	1,800 lb.
Heavy duty	1-11/16 in.	3,000 lb.

The load capacities of motor cars as advertised by the manufacturers show much variation. The values shown in the accompanying table are fairly representative, and are probably adequate from the viewpoint of safety and maintenance.

It will be noted that for the 1-3/16-

in. axle, two load capacities are given. The use of this size axle for a rated loading of 600 lb. is probably based on two considerations: first, the load capacity of the frame rather than that of the axle, and, second, that for any car, the adequacy of an axle less than 1-3/16 in. in diameter is to be questioned from the standpoint of stiffness, even though the load may be relatively light.

Prohibit Heavy Material

To prevent overloading, every motor car should have its load capacity stenciled on it, and the user should be trained to see that this capacity is not exceeded. Especially, the carrying of materials, such as rail, frogs, switches, ties and bridge timbers should be prohibited. Such materials should be carried on a push car, the cost of which is one-third or less of the cost of a motor car, and the failure of which, due to overloading, does not generally involve any hazard of personal injury.

The overloading of a motor car may not result in an accident, but its effect is always reflected in the maintenance cost of the car. Many operators do not realize this. They think that it is all right as long as the car handles the load, and overlook the fact that any car that is operated in an overloaded condition will become racked and more or less loosened at every joint. This increases the cost of maintenance and shortens the life of the car.

Speed

The speed at which a motor car should be operated is usually limited by rule. Most cars will run much faster than the rules prescribe, and violations of the rules in this respect are frequent. While the hazard of personal injury is usually assumed to be the reason for limiting the speed, the effect on the car is not to be overlooked. Excessive speed means increased vibration, and vibration means wear of parts. Excessive speed is a frequent cause of high maintenance cost and short life.

Protection When Not in Use

Proper provisions for the care of a motor car when not in use are of equal importance with the care required by it when in actual operation, as the deterioration may be even greater when it is not used for any length of time than that resulting from constant service. Motor cars must necessarily be exposed to the elements when in use, but there is no good reason why they should not be protected from the weather and from dust, dirt and cinders when not in use. This will add both to their appearance and to their efficiency of operation. A canvas cover should be provided for the protection of the car when it cannot be placed in the tool or motor car house. The cover should be fastened in place in such a manner that it will not be blown off by the wind.

Storage

If motor cars are to be laid up for an indefinite period, the parts subject to damage from corrosion or rust should be protected with oil or other coating, and if not housed under lock and key, parts subject to theft, such as carburetor, oil cups and similar items, should be removed from the car and placed in safe keeping. Gasoline should be drained from the tank and carburetor as a precaution against fire. Cylinder jackets, radiators and water hoppers should be drained in cold weather to prevent damage from freezing.

At Least Once a Week All Tools and Supplies Should Be Removed from the Car to Permit Cleaning, and Only Those that Are To Be Used Should Be Replaced

Loading for Shipment

Many motor cars are damaged in shipment, and care should, therefore, be taken in loading. That a car must be so secured that it will not shift in transit is obvious. That it may be damaged by rough handling of the car in which it is loaded, even though securely blocked, is not so generally recognized. To minimize the damage to itself and to other lading in case it does break loose from its blocking, the motor car should be loaded crosswise in the car. Then to prevent the damage of sprung axles and bent wheels, it must be securely blocked against the sides of the frame or, preferably, against the ends of the axles. If the bottoms of the wheels only are blocked, sprung axles or wheels may be expected if there is any rough handling of the car in which it is loaded. Attention must also be given to other lading in the same car to see that it is so secured that it will not shift in transit and fall on or against the motor car.

Rules—Care of Motor Cars

*(68) If used by a gang, assign one man to care for the car and hold him responsible for its condition.

(69) Inspect the car daily and make such adjustments as are necessary.

(70) Once each week, remove all materials and tools from the car, sweep the deck clean, and remove all accumulations of grease and dirt. A clean car gives less trouble and costs less to maintain.

(71) Once a month or oftener, the operator should make a detailed inspection jointly with the field maintainer and report to him any condition requiring correction.

(72) Make repairs promptly, but avoid tinkering. Do not take the car apart unless you are sure it is necessary.

(73) Keep all bolts and nuts tight and avoid excessive wear through looseness or poor alinement of parts.

(74) Do not use pipe wrench or pliers to tighten bolts and nuts.

(75) Keep brakes in correct adjustment.

(76) Before starting on any trip, check the car to see that it is well lubricated and is supplied with fuel.

(77) Use care in setting car on or off the track.

(a) Do not wedge lining bars or claw bars in frame or wheels to aid in lifting.

(b) Do not cramp wheels in narrow flangeways at road crossings; set the wheels out before turning the car crosswise of the track.

(c) Do not jolt the car over the rails; roll it over easily.

(78) See that all wheels are evently supported when the car is off the track.

(79) Protect the car from dirt and the weather when it is not in use.

(80) Do not overload the car. Know what its load capacity is and do not exceed it.

(81) Do not run faster than safety and the rules permit.

(82) For transporting, load the motor car crosswise of the car and block securely against the ends of the axles to avoid sprung wheels or axles.

*The numbering of these rules is consecutive with a set of general rules that was included in No. 10 of the Series, which was published in the February, 1947, issue page 148.

What's the ANSWER?

Preventing Tie-Plate Cutting

What method or methods, if any, can be employed to prevent tie plates from cutting into the ties? What is their relative effectiveness?

Big Plates Reduce Cutting

By J. W. Hopkins
Principal Assistant Engineer, Bessemer & Lake Erie, Greenville, Pa.

In discussing the factors affecting the mechanical wear of ties as evidenced by tie plate cutting, consideration must be given to wheel loads and the tonnage to be handled, neither of which come entirely under the control of the maintenance of way department. However, both have an important bearing on the overall design of the track structure. Assuming that track is correctly designed for the loads it must carry, the next important consideration is the standard to which it is maintained, particularly as to the type and condition of ballast, and the general drainage situation. Ties will wear much faster when line and surface are neglected. Soft spots cause excessive wear on the ties over and adjacent to them, which usually show more cutting than those on dry, firm roadbed. Work such as is now being carried out by numerous roads, involving better drainage, roadbed grouting, and other means of stabilization will result in reducing the wear of ties.

With the factors referred to given proper weight, it would seem that the reduction of tie plate cutting should involve consideration of the following elements of track, all of which are important: (1) The size of rail; (2) the size of tie plate; and (3) the method of fastening the tie plate to the tie.

The distribution of wheel loads to the ties is dependent, among other qualities, on the stiffness of the rail. Assuming the stiffness of 130-lb. P.S. rail as unity, we find that of 131-lb. R.E. rail is 1.21, and that of 152-lb. P.S. rail is 1.76, based on the moment of inertia of the sections. Without going into consideration of the continuity of rail, deflection of roadbed, etc., which are beyond the scope of this discussion, it is evident that the load per tie would be materially reduced under the large rail, with a corresponding reduction in the amount of tie plate cutting. It should be added that the increase in stiffness obtained with the large rail has a favorable influence on other elements of track maintenance.

The size of tie plate plays an important part in tie plate cutting, since larger plates spread the load over a larger area with correspondingly smaller unit pressures. For example, assume a wheel load of 31,375 lb. under a loaded 90-ton car. For the 7¾-in. by 12-in., and 7¾-in. by 14-in. tie plates, recommended by the A.R.E.A., the unit pressures on the tie would be 337 and 290 p.s.i., respectively, showing a large reduction in pressure under the larger plate. We have found this to be true on our road where we use a 7½-in. by 15½-in. plate under our 152-lb. rail.

The method of fastening the tie plate to the tie, independent of the rail-holding spikes, materially influences the cutting effect of the tie plate. An ideal method would be one that would hold the plate so securely to the tie that no movement would be possible between them under repeated wheel loads. So far such perfection has never been attained in practice, and the problem resolves itself into finding the nearest approach to that ideal. It is common practice to use one or more cut spikes to hold the plate to the tie, in addition to the rail-holding spikes. This helps to hold the plates of course, but cut spikes used as hold-down spikes tend to loosen under repeated wheel loads.

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In June

1. *What methods or practices can best be employed to train capable young trackmen to assume future responsibilities as foremen?*
2. *What are the advantages or disadvantages of using fire-retardant and decay-resistant lumber for the construction of stock pens? Why? Are certain treatments preferable?*
3. *What benefits accrue from keeping the right of way clean and neat by brush cutting, mowing, etc.? How much time are the track forces warranted in spending for this purpose? How can the time and cost involved in this work be held to a minimum?*
4. *What effect does the use of Diesel locomotives have on the stresses in bridges and trestles? How does this affect the maintenance and repair of existing structures?*
5. *What methods are most effective and economical for plowing fire guards? What are their relative advantages?*
6. *What is back siphonage in plumbing systems? What are the hazards involved? What can be done to prevent it?*
7. *What are the advantages or disadvantages of adding sand to crushed stone ballast? If added, what type and percentage of sand should be used? Why?*
8. *When modernizing stations, what type lighting fixtures should be used in waiting rooms? Does the size of the room make any difference? What intensity of illumination should be provided?*

Wave action in the rail has a decided loosening effect. It seemed to us that a better method would be to use screw spikes with spring washers for hold-down fastenings. Therefore, it has been standard construction on our road, on all 131-lb. and 152-lb. rail, to use two screw spikes with double coil spring washers per tie plate on tangents and light curves, and as many as four per tie plate on sharp curves. Our experience with this type of construction, based on 13 years' observation, has been very satisfactory. Tie plate cutting has been reduced to the point where it is very small, and there has been little indication of the screw spikes loosening. We attribute this to the spring washers. Incidently, the use of such construction contributes materially to the holding of the rails to gage on curves, with a corresponding reduction in regaging and spike killing, which is another cause of tie failure.

Increase Plate Size

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

This subject has been before us for many years, without an adequate answer. First, when our engines and cars were light, we laid the rail without any plates. Then we put small plates under the rails, hardly larger than the base of the rail. As engines and cars became bigger, we used larger tie plates, but never large enough. Engines and cars have grown faster than tie plates, and as a result, we have always had tie cutting.

There is only one way to cure most of this trouble, and that is for us to change our standards, so that we will have tie plates and fastenings that are large enough for the biggest engines the mechanical department can think of. The tie plates should be made wider so as to cover more wood on each tie—9 in. by 15 in., under heavy traffic. The top face that fits under the base of the rail should be made flat, to provide uniform bearing, and not just partial bearing through the middle of the plate, as we now have in some cases.

Where new tie plates and rails are being installed we cannot be too careful in preparing the top face of the ties with mechanical adzers, so that the weight on the face of the ties will be uniform. This will help to prevent cutting of the ties later.

Another thing that can be done to help reduce tie cutting is to keep the ties dry by having dry ballast. This can be accomplished adequately only with ballast cleaning machinery. It would be well if the ballast were cleaned from one end of the tie to the other. This would help minimize tie cutting more than anything else.

Tie Pads Have Merit

By R. L. Baucom
Engineering Department, Missouri Pacific, Jefferson City, Mo.

The plate cutting of ties is a problem for which there seems to be no complete cure. It is obvious that the method by which the tie plates are fastened to the ties determines the amount of mechanical wear of the ties. Cut spikes, bolts, spring clips, screw spikes, etc., have all been used with varying success, but none of them have entirely eliminated the cutting of ties. The most effective of them all seems to me to be the method employing bolts, but its impracticability prevents its general use. Whatever method is used loses its effectiveness if an even bearing is not provided on the tie for the plate. The correct adzing of ties in the field has materially reduced the amount of mechanical wear.

The use of longer and heavier tie plates has tended to minimize the cutting of ties. Additional hold-down spikes have also reduced mechanical wear by securely fastening the plates to the ties.

Recently, tie pads have been placed between the tie plates and ties to serve as cushions and absorb shock from wheel loads. This reduces the tie cutting to a minimum, and I feel that it comes closest to being the best answer.

Stabilizing Masonry Piers

What are the practicable methods of underpinning or otherwise stabilizing masonry piers or abutments which show evidence of settlement or undercutting? Does the urgency of the situation or the water conditions involved make any difference in the method selected?

Retain Sand With Sheeting

By K. L. Miner
Engineer of Bridges, New York Central, New York

The first step in the stabilization of bridge piers or abutments which require strengthening because of either settlement or undercutting is to drive steel sheet piling enclosures about the weakened portion of the structure. For this purpose I have found that a section of steel piling known as M115, about 19-in. wide, and weighing 22 lb. per sq. ft. of finished wall, is both satisfactory and economical.

Where settlement has occurred I have found that it is best to drive the piling from four to five feet outside the footing and down to rock, or to a positive depth of four to eight feet below stream bed so that the water pressure will not break underneath the sheeting when the enclosure is dewatered. Then pump out this cofferdam and underpin the footing with concrete in a manner that is accepted as good practice. The steel sheeting, which is left in place, serves the following purposes: (1) Confines the material under the foundation; (2) protects the structure from any further disturbance of its supporting foundation; (3) acts as a cofferdam for de-watering; and (4) provides the outside form for concreting the underpinning.

Where undercutting has occurred, the sheet piling is driven only about a foot outside the footing, and down to rock, or about four to eight feet below stream bed, depending on the nature and solidity of the material in which it is driven. Then the area between the masonry and piling is filled with clean sand. The top of the sheeting should be left above the footing at least two feet, or to a height above mean high water, and should be anchored to the masonry by dowels or secured from side to side by rods extending through the masonry. In case of navigable waters, 8-in. by 8-in. guard or rubbing timbers may be bolted to the steel piling. The sand will flow so as to fill the voids underneath and about the masonry. I prefer a sand fill to the use of concrete because it will always adjust itself to any possible future voids. The top surface of the sand can be dressed off with hand-placed one-man stone to serve as rip-rap. Furthermore, the sand is cheaper and more easily placed than concrete.

In some cases where the material between the rock and masonry has been partially washed out, and the piling has been driven to rock, I have filled this area with one-inch broken stone, and then filled the voids in the stone with neat cement placed by the gravity grouting method, using two to four-inch holes drilled through the masonry from the top. The gravity method of grouting consists of mixing

the neat cement with an abundant amount of water, and allow this mixture to flow through the holes in the masonry to the stone below. The water acts as a flux for the flow of the cement to the voids in the stones. No equipment or machinery is necessary for this method of grouting.

The top of the steel sheeting should be properly secured and protected. For appearance, the top can be cut to a reasonably true line, capped with 4-in. by 4-in. angle iron, and the exposed metal above the water surface painted or covered with hot asphalt.

Uses Steel Sheet Piling

By Engineer of Bridges and Structures

The method to be adopted to stabilize bridge substructures to provide protection against scour depends on the following conditions: (1) The location of the structure, the type of superstructure and its height above the stream bed; (2) the condition of the masonry—that is, whether urgent repairs must be made, using materials that are immediately available, or whether it is considered safe to postpone the work until other and probably more favorable materials can be obtained; (3) the size of the bridge opening, and whether or not this can be reduced; and (4) the type of foundation—whether piles, timber mat, spread footing, etc.—and the character of the foundation material.

In general, the most economical and effective method of stabilizing and protecting a river pier against scour is to drive steel sheet piling parallel to the perimeter of the pier footing and about two or three feet from it, excavate the stream bed to the bottom of the footing, and fill the space between the piling and the masonry with reinforced concrete, dowelled securely to the pier. It is usual also to have steel anchors welded to the piling and extending into the concrete. For most conditions, the sheet piling may be cut just above the water level with an oxy-acetylene torch. A similar method may be used at abutments that need to be stabilized and protected against scour.

In case an abutment shows signs of settlement or forward movement, it is customary to build a reinforced concrete buttress in front of it and to dowel this buttress securely to the old structure. Occasionally it is necessary to extend the buttress under the abutment footing for underpinning. The size of such a buttress is determined from knowledge of the loads that are supported by the abutment and the character of the foundation material. It is necessary sometimes to provide pile supports for the buttress, in which cases the bearing value of these supports should be developed by the load to be carried, taking into consideration the load transferred by the dowels and bond between the old masonry and the new concrete.

Where work is to be done on river piers and abutments, it should be determined whether the smaller waterway opening resulting from the new construction will be sufficient to carry the maximum flood discharge to be anticipated. Wherever the existing opening is barely sufficient for the need, the masonry reinforcement should be designed to hold the reduction in opening to a minimum.

How to Warn Gangs of Trains

What is the best method of warning track gangs using power tools of the approach of trains? Are there any effective devices which may be used?

Uses Approach Watchmen

By J. W. Bell

Engineer of Track, New York, New Haven & Hartford, Providence, R. I.

On the New Haven Railroad we compel all gangs working on the track to clear all main tracks for the passage of trains. We have found that the best way of warning these gangs of the approach of trains is to have a man with a white flag two feet square stationed a sufficient distance in both directions from the point where the gang is working to obtain the best view of approaching trains. In addition, a "whistleman" is stationed at the place where the gang is working. His duty is to observe the two men with the white flags. When either of the flagmen sights a train he wigwags hs flag. This wigwagging is noticed by the "whistleman" immediately, and he blows his whistle, warning the gang that a train is approaching. Everybody then clears all tracks at once.

This method of warning has been in use on the New Haven for several years, and I believe it is superior to any of the mechanical warning devices with which I have come in contact, in that some of the equipment necessary for their operation is so bulky that they are not easily portable.

Suggests Whistle Horns

By A. Drager

M. of W. Storekeeper, Central Railroad of New Jersey, Jersey City, N. J.

With the present high speeds of trains and the noise made by power machines, it seems to me that the mouth whistle is not an adequate warning signal for men working on the track. Often it is not heard in time for the men to get themselves and their tools into the clear.

There are hand-operated whistle horns on the market which give a much louder warning sound than whistles. These horns can be carried around by one man, are easily operated, and can be heard for a mile or more. They have been used extensively in the Navy as fog horns, and I believe would be a great aid in accident prevention.

Prefers Use of Telephone

By William Lindsey

Extra Gang Foreman, Chicago & Illinois Midland, Springfield, Ill.

From my experience, I have come to the conclusion that the best way to warn track gangs using power tools of the approach of trains is by use of the telephone. On our railroad, which is a single-track main-line system, everything has to be figured out closely so there is minimum delay to trains or work gangs. Of course we ask for and get the cooperation of both the transportation and signal departments. When we start a surfacing gang using power tools, we install a reliable man from the gang at a portable telephone, which can be moved with the gang as the work progresses. With flag protection established, this man gets a morning lineup from the dispatcher so as to determine as near as possible what trains are to be run during the working hours.

From this start, the telephone man keeps his own "train sheet," marking down the progress of the trains from time to time as they near the position of the gang. He then gets their approximate time of arrival from the dispatcher. Acting on this, as well as on his experience as to how long it takes to remove the power tools, the foreman makes his track safe, removes his tools, and lets trains pass, in the majority of cases only slowing them enough to receive a hand signal to proceed. By using this method we are able to hold train delays to a minimum, get the fullest use from our power tools without too much waiting on trains, and still have time to remove them safely.

However, in this set-up, the telephone operator must be on duty constantly during the gang's working hours so as to follow all trains, check on delays, etc. By doing this he reduces the number of his calls to the dispatcher and thereby avoids interference with the movement of trains by taking up the dispatcher's time. At the same time, he is able to furnish information so that the track work can proceed without delay; power tools can be removed with a minimum of unproductive time; and the men can clear the tracks safely.

Various Methods Used

By Roadmaster

Since trains may be run in either direction on any track at any time, track gangs using power tools should be instructed when they start work, and cautioned frequently afterwards as to which direction and in what manner they should clear all tracks upon the approach of trains on any track.

The method of warning workmen to clear all tracks depends on the location. If the gang is working in the open, a shrill whistle used by a man assigned to that duty will be sufficient. However, in obscure locations where approaching trains can be observed for only a short distance, it is necessary to establish lookouts in both directions, so that advance warning can be passed to the man watching at the location of the gang. The method used by the advance lookouts to give signals will also depend on the location, but all signals must be of such nature that there can be no misunderstanding as to their meaning.

There may be locations where it would be economical and expedient to set up mechanical signal devices, but it seems to me that such locations would not be numerous. Inasmuch as any such places would be special in nature, specific studies would have to be made in regard to them.

Means of Controlling Erosion

What are some of the effective methods of controlling erosion on new cut slopes or embankments? Should the method be different for cut slopes and embankments? Why?

Use Intercepting Ditch

By Assistant Engineer

Proper erosion preventive measures, if taken at the time of constructing new railway cuts, will prove to be of lasting benefit after the new line is placed in service. The extent to which the preventive measures are carried will, of course, depend upon the depth and length of the cut and on the annual rainfall usually encountered in the section of the country in which the cut is located.

In deep cuts, the use of an intermediate intercepting ditch, constructed parallel to the track, and extending along the side slopes of the cut, has proved very satisfactory. Where such a ditch is used, it should follow the natural gradient of the track and should, of course, be constructed in connection with a wide berm, particularly if the earth is unstable when saturated with water. If the location is subject to frequent and heavy rains, it may be impracticable to carry the ditch the entire length of the cut, and it may become necessary to lead the water down the slope of the cut and into the side ditch, or across the railroad through a culvert to lower ground. Where this is done, consideration must be given to protecting the roadbed from undercutting. In many cases it will be found desirable to provide two or more intercepting ditches, particularly where the cut is of unusual depth. Also, such a ditch may be constructed about 10 ft. back from the top of cut to divert water before it reaches the excavation.

The use of precast half-round concrete pipe as multiple sluiceways on the faces of cuts has also been found helpful in preventing erosion, particularly where frequent heavy rain storms of short duration are to be encountered. Where such pipes are used, they are installed diagonally across the face of the slope from the top of the cut to the side ditch. Each of these sluiceways should begin at the top of the cut directly above the point where the adjacent sluiceway reaches the track ditch. It is important to construct masonry or concrete headwalls and aprons at the top of such sluiceways to prevent water from washing the material from under the pipe and causing its settlement. Also, it will be found necessary to take measures to prevent water from sluiceways from undercutting the roadbed.

Whatever type of erosion-preventive ditch is used, it remains effective only so long as it is kept clean. Therefore, attention should be given the intercepting ditches and sluiceways at least once a year, preferably shortly before the beginning of the season of greatest rainfall.

Steepen Clay Slopes

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

The erosion of cut slopes and embankments cannot be treated as the same problem inasmuch as embankments are man-made, while the exposed surface of cuts are the original materials of nature.

Cuts made through sterile sandy soils which may erode from the action of either wind or water can be protected best by the application of heavy asphaltic oils, or by spraying with hot applications of tar or asphalt. It is seldom necessary to spray fills of loose sterile sands with either oil or asphalt, although there may be some locations where such spraying would be economical. In general, the soil of fills that are compacted correctly can be fertilized sufficiently to obtain a good growth of selected vegetation. Although it may be true that the vegetation selected may not have a deep-rooted growth, there is little likelihood of fertilized soil slipping downward as the plant growth should absorb most of the water falling on the fill.

The protection of clay or loamy cuts requires entirely different methods from those used in sterile sand. In some locations it is the practice to establish flat slopes in such cuts and endeavor to protect them with plant growth. This may result in water following the plane between the fertilized soil and the sterile materials underneath, causing the covering on the cut to be displaced in long, wide sheets. The planting of deep rooted vegetation on such slopes is not usually effective for long periods inasmuch as the roots will not penetrate sterile clay, but have a tendency to run along close to the surface where there is an abundance of moisture and plant food.

The best method of preventing erosion in clay cuts is to excavate the cuts as nearly vertical as the soil will stand, and then make absolutely sure, by cutting berm ditches or drains at the tops of the cuts, that the minimum of water will come onto the cut slopes.

Entirely too little study of soil mechanics has been utilized in the past in excavating cuts or building fills, but present engineering practices, if carefully followed, should control erosion on both newly cut slopes and on embankments.

Silting of Reservoirs

What, if anything, can be done to retard or prevent the silting of reservoirs? Where silt has accumulated to such an extent as to reduce the capacity of the reservoir seriously, what can be done to remove it?

Forestation Checks Silt

By H. E. Donovan
Assistant Engineer, Chicago, Milwaukee, St. Paul & Pacific, Chicago

The American Society of Civil Engineers, in reporting on the subject of reservoir silting in 1944, concluded that, "The prevention of erosion, by checking sediment production at its source, appears to be the best remedy for minimizing the silting of a reservoir."

Forestation of the reservoir run-off area, where possible, will reduce silting. This method has the added advantage of checking the loss from evaporation, by obstructing the wind, reducing the action of waves, and cooling the air. If this means of protection cannot be provided, planting the area to grass will be helpful in reducing washing. Erosion ditches which develop should be filled to prevent their enlargement.

Cleaning heavily silted reservoirs is costly, but in most cases there is no other recourse. The usual practice is to use a dragline for removing the material below the surface of the water, casting it beyond the high water contour. If the removal can be accomplished during a period of low water, a bulldozer can also be used. There is no inexpensive way of doing this job. Available data indicates that the cost approximates $2 per 1,000 gal. of storage capacity provided.

Settling Basins Helpful

By W. D. Gibson
Assistant Engineer, Chicago, Burlington & Quincy, Chicago

Our lines cover considerable territory in parts of Illinois, Iowa and Missouri, where well water of usable quality is practically unobtainable. Consequently, we have been compelled to resort to impounding reservoirs as a source of supply. Soil erosion is prevalent in most of this territory, and many of the streams that have been impounded carry a large amount of mud and silt, particularly at times of heavy precipitation. As a result, many of the smaller ponds have silted over a period of years to the extent that their capacities have been seriously affected. Only the fact that the increased use of Diesel and gas-electric power has reduced the demands for water has saved us from a great deal of trouble.

In some of the instances where action was necessary, we were compelled to use a crawler dragline to remove the accumulated silt. This machine worked around the perimeter of the pond, digging as deeply as possible. It was found that by digging at one location for some time, the material beyond reach of the boom would gradually wash or fall back toward the deepened portion where it could be reached. At one location where steep banks prevented the casting of the excavated material it was necessary to raise the dam to provide additional capacity.

A preventive method has been used for some of the small ponds in flat country, consisting of the construction of a small auxiliary pond or settling basin, in which water from a particularly muddy stream could be held long enough to precipitate the suspended matter before it reached the main storage reservoir. This auxiliary pond can, as a rule, be cleaned readily with a dragline.

Our observations have convinced us that if it ever becomes necessary to construct a new reservoir, we shall insist that enough area be obtained to retain as much of the natural terrain as possible, preferably wooded or well-sodded ground, to prevent erosion from the immediately adjacent territory. Also, wherever the survey indicates that feeding arms or draws will be necessary, these will be made as long as practicable, so that a large amount of the precipitation will take place in them instead of in the main reservoir.

New Power Tools and Machines

What is the best method of introducing new power tools and machines on territories where they have not been used previously? Should experienced mechanics or manufacturer's representatives be present?

Depends on Many Things

By S. E. Tracy
Superintendent of Work Equipment, Chicago, Burlington & Quincy, Chicago

The best method of introducing new power tools and machines on a territory where they have not been used previously depends upon the type of power tool or machine proposed, by whom the equipment is to be operated, the nature of the work to be performed, the type of organization in the work equipment department, and other pertinent facts.

For example, if the equipment is to be operated by a regularly assigned equipment operator who has been previously instructed and qualified in all the work it will perform, there is little need of a special method of introduction, even though the equipment may not have been used previously on the territory. In such cases the local supervision is usually well acquainted with the equipment and has mapped a program for its use far in advance of the date it is actually received. On the other hand, entirely different conditions exist where the equipment is to be operated by local forces, and is to be passed along from one gang to another, or if it is of an entirely new type that has not been used previously at any location on the railroad.

Assuming that the size of the work equipment organization on the railroad is consistent with the amount of equipment owned, the members of that organization should introduce all equipment to the user, whether it is a type new to the railroad, or an old established type being extended to a territory where it has not been used before. Such a practice eliminates many of the problems that arise in the proper method of introduction. In addition, it provides a means by which the maximum results can be obtained from the equipment for its entire life.

Of course, it is the duty of the manufacturer's representative to acquaint the railroad supervision with the correct method of operation, care and maintenance of the equipment. He probably does this, in a general way at least, before the equipment is purchased; if so, the nature of the equipment will then govern the advisability of requesting his presence when it is placed in service. It is usually advantageous to both the railroad and the manufacturer to have the latter's representative present when new equipment is placed in service, but there are other important considerations, and unless the railroad has an organization of sufficient size to follow up and program the work, the maximum results cannot be obtained.

Service Man Is Necessary

By V. W. Oswalt

Assistant Superintendent of Scales and Work Equipment, Southern, Washington, D. C.

Introducing new tools and machines on territories where they have not been used previously presents a problem of vital importance. Usually the buyer and seller have a sales agreement which arranges for the installation, servicing and the general performance of the equipment. Since the correct installation and servicing of equipment definitely governs its performance and life, the best possible service at the time of installation is important.

The service representative furnished by the manufacturer should be given every opportunity to impart his expert knowledge of the equipment. The buyer or user should take full advantage of this knowledge, and should arrange for his supervisors, maintainers and operators to be present during the servicing period.

An experienced mechanic or service representative of the manufacturer should always be present when a new piece of equipment is introduced on a new territory, since he has been trained to educate maintainers and operators so that the equipment will get the best attention possible. This insures a long, useful life for the equipment, which is in the interest of the manufacturer as well as the railroad. The same practice should be followed whenever new models of tools and machines are delivered.

Instruction Necessary

By W. H. Sparks

General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

If all the new machinery and tools that are being bought by the railroads are to accomplish the work for which they are designed, a representative of the manufacturer, as well as a railroad mechanic, should be present when they are first put to work. Many a good machine has been ruined on its first job by an inexperienced operator, so that its future performance was not satisfactory to the railroad. This means a dissatisfied customer for the manufacturer. Neither the railroad nor the manufacturer can fail to benefit from having on hand, when a new machine is put to work, some one who knows every part of the machine.

Even though the track forces have become "tool-minded," it is impossible for them, without assistance, to understand all they should know about the use of a machine they have never seen before. They must be educated in the best way to handle the machine to get the most work done, while keeping it running as much of the time as possible. They can't just start in wrong, wait for something to happen, and then run for help. The best people to teach them how to use new machines are the service men from the plants where the machines have been made or foremen or mechanics who have been given operating instruction by such representatives.

Materials for Interior Walls

What are the relative merits of plaster and some of the newer materials for the surfacing of the interior walls and ceilings of small stations? Does the size or use of the areas involved make any difference?

Newer Materials Better

By S. R. Thurman

Supervisor Bridges and Buildings, Missouri Pacific, Nevada, Mo.

The maintenance of the interiors of small stations has always been a live subject, both from the standpoint of economy and appearance. Painting of walls and ceilings from time to time has usually been the accepted form of redecoration. This has been done so repeatedly that there is usually a thick layer of paint that cracks and peels, giving an unsightly appearance even after being newly painted. To get a good job, all old paint must be removed. After this the plaster must be patched, and in some instances renewed, if it has been badly damaged by vibration or other causes. Patched plaster does not paint evenly, but leaves a spotted appearance unless the patches are thoroughly seasoned for several weeks. This is caused by the oils in the paint becoming saponified on the new plaster.

A more durable, cheaper, and much better looking wall can be obtained by removing all the plaster and applying Newwood, Presdwood, Flexboard or any of the several wallboards that are available. All of these are easily applied and can be painted any color desired. Some of them have a pleasing appearance after being given a coat of clear varnish which preserves their natural color. Wallboard should be well nailed and paneled with either wood strips or strips of the material used on the wall. These strips should be about two inches wide and may be either painted the same color as the panels or, if desired, may be stained light oak and varnished as if wood were used.

The ceiling may be finished with any of the various beveled panels made for this purpose or with Flexboard. These materials may be left natural, or painted any color desired. If Flexboard is used, it should be given a prime coat of aluminum paint before the color is applied. Any of this material must be applied over a layer of 15-lb. roofing felt, cemented at the joints to prevent dust from leaking through and soiling the finish. It must be nailed carefully to prevent its sagging or buckling from its own weight, or from vibration.

Many Materials Available

By L. C. Winkelhaus

Architectural Engineer, Chicago & North Western, Chicago

In frame construction, the general practice has been to cover the inside walls and ceilings with a plaster base—either fiber board or plaster board—followed by two coats of plaster, the last being a lime putty, troweled to a smooth finish for painting. Sometimes a good wainscot has been applied directly to the plaster base, up to windowsill height.

The present trend, however, is to provide something different and more decorative. Today, the architect has a wide variety of materials from which to make a selection in carrying out his own ideas or in executing those of his management. With this in mind, the public areas of small stations should be provided with a good substantial wainscot and a base board of similar material. This can be accomplished with any of the cement-asbestos materials, which come in sheets of various thicknesses and can be applied directly to the studding. Moulded joints of aluminum, plastic, or possibly other materials, are available. The natural grey color of the cement-asbestos is not out of place, but can

be painted to suit, if a different color is desired.

Above the wainscot, planked fiber board, in any of the various widths and colors which are on the market, can be applied either vertically or horizontally. The former is preferable. This material is tongue and grooved, and can be nailed directly to the studding.

A cement-asbestos product, or tempered Presdwood, can be used above the wainscot as a substitute for planked fiber board. This material is about ⅛ in. thick and can be obtained with a high polish, in various colors. It must have a backing of wood sheeting or fiber board. Aluminum, plastic or some other material is required for covering the joints.

Paneled fiber board material in various sizes and colors is available for the ceiling, which must be "stripped" or furred to provide a proper nailing base. If the ceiling is particularly high, the material should be carried down the side walls at least a foot. This material has an insulating value as well as being decorative, and need not be painted when first applied, as it is furnished with a paint coating.

In most states it is a code requirement that the walls and ceilings of toilet or wash rooms be plastered. Of course, impervious materials for walls and ceilings are acceptable, but their relatively high cost does not warrant their use in the smaller stations as a general rule.

Salvaging Bridge Timbers

To what extent can ties and timbers released from bridges be resawed for use in building construction and maintenance? Who should do this salvaging work? What special equipment should be provided?

Has Many Possibilities

By T. E. Jackson

General Bridge and Building Supervisor, Southern Pacific, San Francisco, Cal.

To date, we have not used any of our second-hand bridge material for this class of work, mainly because we have use for all of such timber to reinforce other similar structures. However, we can see the possibility of the need of this material for buildings, and repairs to certain other members of our trestles, buildings and platforms. It is my personal opinion that ties, stringers, and even caps and posts of frame bents, could be resawed for dimension material for the renewal or repair of buildings and trestles. Ties that are not decayed or split too badly can be sawed into 4-in. by 6-in. timbers, surfaced if required, and used for handrail posts, and handrails on trestles and bridges where such are necessary. Stringers that are sound and not full of shakes could be resawed into 2 in. by 12 in., 2 in. by 6 in., 2 in. by 4 in., 1 in. by 6 in., 1 in. by 8 in., and 1½ in. by 8 in. sizes.

The 2-in. by 12-in. lumber could be reused for freight platforms, footwalks on trestles, and joists for buildings. The 2-in. by 6-in. and 2-in. by 4-in. material would make good rafters in buildings, or have many other uses. The 1-in. by 8-in. boards could be applied as sheathing on buildings, etc. The 1-in. by 8-in. and 2-in. by 8-in. boards could serve as handrails on bridges and trestles.

It seems to me that the best way to salvage this material would be to have the bridge and building gang remove the material from the structure being repaired and ship the salvageable items to a central shop having a lumber mill. This mill could be furnished with all data and information so that it could cut and surface the material to any dimensions desired. If such a mill is not available on the division, a large ripsaw, 24 in. in diameter, and several bandsaws and planers, would be all the equipment necessary to convert the larger timbers into smaller dimensions.

Naturally, there would be some waste because of the bolt holes in caps and stringers. Most of the holes are ¾ in. in diameter and would probably weaken some of the timber so that it could not be used in some instances. In other cases the holes would make no difference. For instance, I doubt if the 2-in. by 12-in. material used for footwalks would be weakened very much by the holes.

Uses System Planing Mill

By C. E. Jacobson

Engineer Bridges and Buildings Atlanta & West Point, Western Railway of Alabama, and Georgia R.R.

We have used ties and timbers released from bridges with considerable success and saving. In many cases ties become badly cut under the bridge tie plates and have to be removed in order to maintain the track in surface. These ties, although not serviceable in the trestle, can be used as post supports in platforms, or as caps to support longitudinal floor joists. Ties often check or split badly and must be removed to eliminate the hazard of fire. Such ties can also be used in platform maintenance and give many years of service.

We have also successfully salvaged treated caps which have split open, or started crushing under traffic. After removal, they were shipped to our lumber yard and sawed into pieces from 2 in. by 12 in. to 6 in. by 12 in., depending on the condition of the timber. This work has been done in our shop's planing mill. However, a first class bridge gang should be equipped with a 12-in. circular saw, either air or electric powered, with which any size lumber desired can be sawed from the pieces mentioned above. This type saw can even rip a 7-in. by 16 in. damaged stringer by making two cuts through the 7-in. side, and thereby obtain any size timber needed.

Who does the salvaging depends upon the size of the railroad and what expense it is willing to incur in order to set up equipment to handle it. We do not carry on a regular salvage program because of the size of our system, but do such work during slack periods at the planing mill, or whenever lumber is required.

Wouldn't Resaw Ties

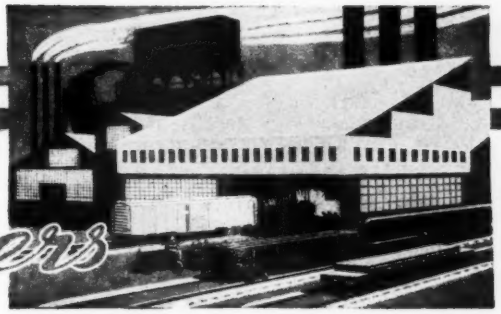
By J. L. Anderson

Bridge and Building Supervisor, Missouri Pacific, Osawatomie, Kan.

My experience with the use of released materials, such as ties and timbers from bridges, has been far reaching for many years. Untreated bridge ties are more or less checked or weather cracked, and are usually filled with grit which would be hard on saws. These timbers could be used for sills in stock chutes or for stock yard posts. If they are sound, they should be treated, as it would be unnecessary to saw this material again.

Bridge stringers can be resawed for use in building construction or maintenance if someone who knows timber supervises the selection of the best part of each piece to be cut to the size needed. Many lineal feet of good, sound and seasoned dimension lumber could be obtained from released bridge materials. Such salvaging work would require no special equipment other than a rip saw and a cutoff saw, unless it was desired to have the salvaged material treated with preservatives.

PRODUCTS of Manufacturers



(For additional information on any of the products described in these columns, use postcards, page 419)

Nordberg to Offer Ballast-Cleaning Service

THE NORDBERG Manufacturing Company, Milwaukee, Wis., has made preliminary announcement of a new ballast renovating service to the railways, which involves leasing to individual roads, on the scale desired, its various recently developed ballast digging and cleaning machines. Complete details of the plan will be announced later, but it is known to involve essentially three principal machines—the Cribex, for excavating foul ballast from the tie cribs; the Ballastex, which will dig the ballast from the inter-track space or shoulders; and a Screen Car, which, when it is not desired to waste the material directly from the Ballastex, will remove all dirt from the ballast and deposit the cleaned ballast back uniformly in the track—cribs, shoulders, and inter-track space.

Under the lease plan being set up, the Nordberg Company will build up a pool of the various units involved and will make them available to the roads in the numbers and types required to carry out the specific kind and quantity of work planned.

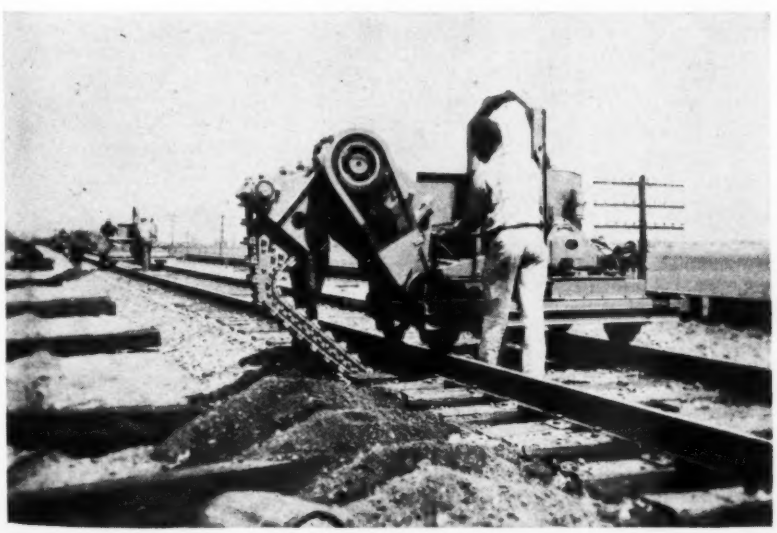
The company will maintain all of the equipment so leased, but the railroads will furnish all labor, including operators, for carrying out the actual field work.

Through this plan, the Nordberg Company expects to secure intensive use of its equipment, possibly in more than one shift a day in many cases, and thus enable the roads to catch up on their deferred ballast cleaning sooner than might be possible otherwise. The new plan does not affect the direct sale to the railroads of other Nordberg machines.

LeRoi Tractair-Trailer Combination

THE LE ROI Company, Milwaukee, Wis., has adapted the Model 105 Tractair, a tractor-mounted compressor, for use in combination with a 60 c.f.m. portable compressor in such a manner that the full capacity of each machine is available in the combined unit. For use in this combination, the air receivers of the two machines are interconnected by means of a balance tube which is equipped with a pilot valve and quick detachable fittings. It is said that the setting of the pilot valve is the only adjustment required to operate any combination of compressor sizes.

Multiple air manifolds provide connections for any air-powered equipment up to the capacity of the combination. When used in combination, both machines remain standard in every respect and can be used individually or combined without changeover to fit job conditions. This arrangement is said to result in extreme flexibility as the combined unit is self-propelled, and either unit is available immediately and individually for smaller jobs not requiring the combined capacity.



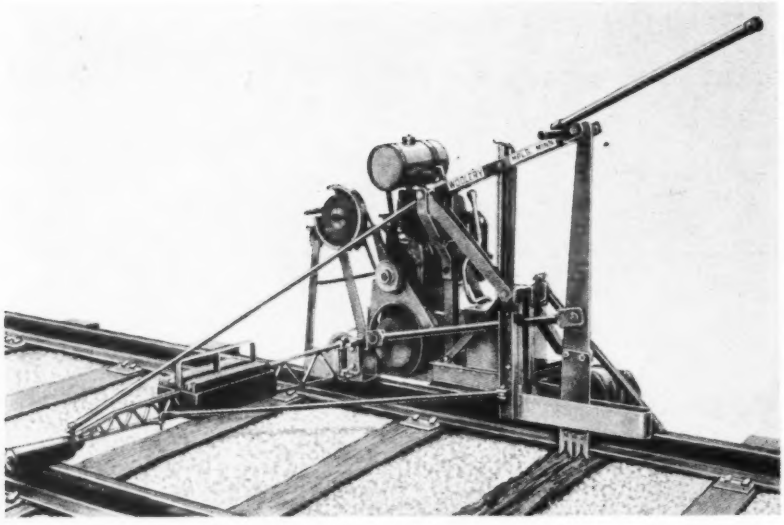
One of the Nordberg Cribex Machines Shown With its Boom Partly Penetrating a Crib

Improved Tie Cutter

THE Woolery Tie Cutter, manufactured by the Woolery Machine Company, Minneapolis, Minn., has been redesigned to provide a more simple, yet rugged machine, while incorporating the principles of the original unit.

Like the earlier Woolery Tie Cutter, the improved unit, known as Model N, is comprised of a two-wheel carriage operating on one rail, with a folding balance arm for stabilizing the machine by contact with the opposite rail. The carriage supports the power unit and the cutting mechanism, consisting of a reciprocating arm, at the end of which is a toothed cutting blade.

In the improved model, self-centering wheels with smaller flanges have been provided to avoid damage to signal bond wires; an improved friction slide has been incorporated to make the cutting operation smoother; folding lift handles have been provided that require less storage space; the number of working parts has been reduced by providing a sturdy countershaft mounted in extra-capacity pillow



The Improved Woolery Tie Cutting Machine

block ball bearings; the Pitman bearings have been increased in size and capacity to secure longer life; larger flange-mounted type wheel bearings have been incorporated in the unit for longer life and easy rolling; and a removable spare-blade carrier has been provided so that the work of lifting the unit from the rails will be facilitated. As in the earlier model, a belt-driven grinder is provided for sharpening the cutting blades.

In operation, the unit is used to cut ties into three pieces, with a cut being made just inside each rail. After cutting, the end sections are pried out, using the center piece as a heel, after which the center piece is lifted out from between the rails. The principal advantages claimed for the unit include the rapidity with which the ties may be removed—the average time per cut being 25 sec.—and the minimum disturbance of the ballast bed at each tie. The weight of the unit is 338 lb.

Simplex Track Jacks

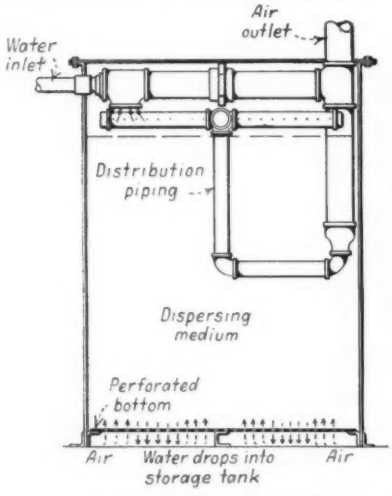
A NEW line of Simplex track jacks, designated as Type A and embodying four major improvements over earlier Simplex Jacks, has recently been introduced by Templeton, Kenly & Co., Chicago. Of the single-acting or trip type, the new line features an improved ball-and-socket design which is said to reduce maintenance of the jacks by 81 per cent; a shorter fulcrum center which is reported to result in 31 per cent easier lifting; a safety thumb guard for greater protection for the operator; and a larger striking surface to increase the service life of the jack.

Many features are retained in these new units from the earlier models of Simplex jacks.

The new jacks are available with a choice of three sockets, which include a square socket for use with lining bars, and oval or round sockets for use with lever poles.

Decarbonator For De-Ionizing

THE Dearborn Chemical Company, Chicago, has developed a new Liquimatic decarbonator of metal construction to replace the wooden de-



Showing Construction of the Dearborn Chemical Company's New Decarbonator

carbonators formerly used with this company's water de-ionizing plants. An outstanding advantage of the new decarbonators is their compact design compared with wooden decarbonators of similar capacity. For example, one of the new units, 60 in. in diameter by 60 in. high, capable of handling 75 to 100 gal. per min., will replace an older model 19 ft. in height.

Other advantages claimed for the new decarbonators are fewer mechanical parts and reduced power consumption without loss in efficiency. The new units are entirely self-contained and require no blowers, air heaters, compressed-air connections or similar accessories.

The necessary circulation of air is provided by means of a special ejection system which utilizes the energy of the incoming water in combination with an efficient dispersing medium. This system is said to break the water into a thin liquid film, thereby expediting release of the dissolved gases.

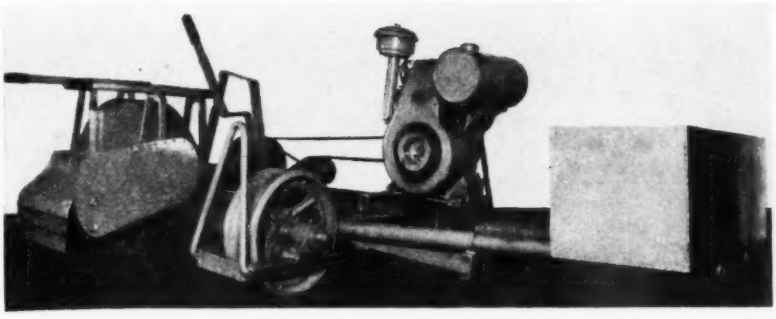
Thornley Cribber

THE Thornley Railway Equipment Company, Joliet, Ill., is now offering the Model D Thornley Cribbing Machine for use in removing the ballast from the cribs in the vicinity of the tie-plate areas during rail-laying operations. This machine, designed for one-man operation, is said to be capable of operating at the rate of one 39-ft. rail per minute.

The machine embodies a carriage mounted on two double-flanged wheels, and arranged for operation on one rail, which supports a frame carrying the cribbing device and the power unit. The cribbing operation is accomplished by means of a manganese-steel wheel, with removable cribbing shoes of chrome-nickel steel, operating in a vertical plane and rotated by a six-horsepower gasoline engine through a combination belt-and-chain drive. The power unit is located on the opposite side of the two-wheeled carriage from the cribbing wheel as an aid in balancing the unit. Additional balance is provided by means of a steel box, for holding counterweights, which is welded to telescoping pipe extensions so that the box can be quickly shifted as necessary to clear for trains passing on an adjacent track.

Safety features of the unit include a guard enclosing the cribbing wheel proper, with flexible steel guards around the base of the cribbing wheel to prevent the operator from being struck by loose pieces of ballast. Also, an oil-tight case encloses the chain drive for the wheel. An adjustable gauge permits cribbing to various depths up to seven inches below the tops of the ties.

(*For additional information on any of the products described on this page, use postcards, page* 419)



The Model D Thornley Cribbing Machine

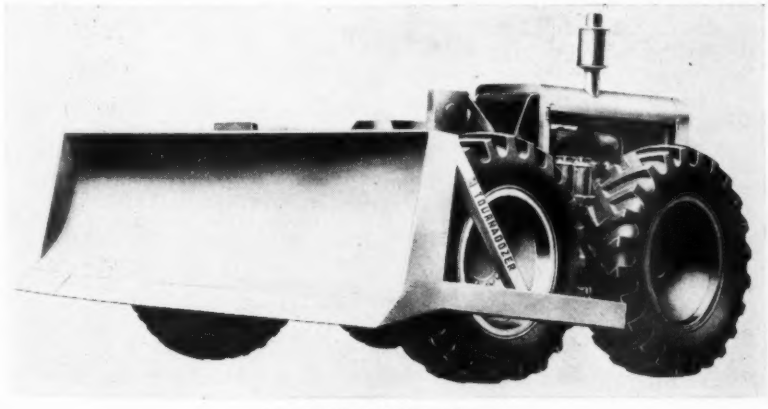
Tournadozer

R. G. LeTourneau, Inc., Peoria, Ill., has added the Model C Tournadozer, a high-speed pneumatic-tired unit similar to a tractor bulldozer to its line of earth-moving and construction equipment. The Tournadozer consists of a four-wheel tractor, powered by a 160-hp. Diesel engine, with a 44-in. by 11-ft. 3-in., cable-conrolled blade, mounted at the front end. The tractor unit is capable of four speeds ranging up to 12 m. p. h. in each direction and is equipped with a Tournamatic constant-mesh transmission, which is said to enable the operator to select any gear ratio or to change from forward motion into reverse without shifting gears. The unit is steered by means of air-actuated disc clutches and brakes.

The Tournadozer is mounted on four 14 by 32 taper-bead tires and is said to be designed so that greater weight is put on the tires as the power requirements for digging or push-loading increase. The tires are designed for low pressures, a feature that is said to have advantages in cushioning the machine against shocks and vibrations and in reducing tire wear.

It is reported that the high-speed Tournadozer is suitable for use in a variety of earth-moving work and that it is at its greatest advantage on work that requires much backing and maneuvering. Its ability to operate over paved areas without damage, because of its rubber mounting, is said to broaden its job mobility and usefulness.

Specifications for the Model C Tournadozer include a 5-ft. 11⅝-in. wheel base, an overall length of 15 ft. 2 in., a height of 7 ft. 11 in., and a shipping weight of approximately 14½ tons.



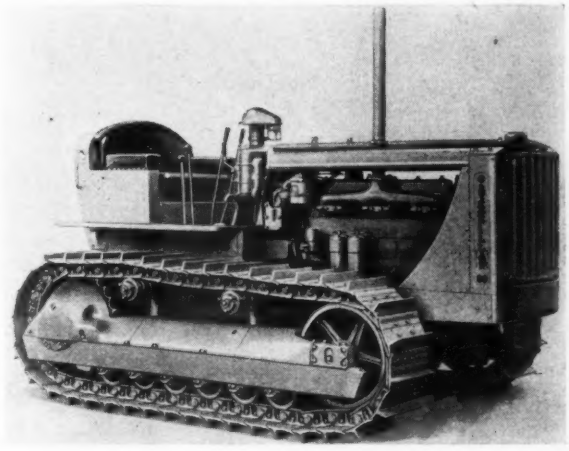
The Model C Tournadozer

Improved Caterpillar Tractors

PRODUCTION of two improved Diesel track-type tractors, known as the D-4 and the D-6, respectively, has been announced by the Caterpillar Tractor Company, Peoria, Ill. Both models are said to have improved transmissions, and final drives and clutches as a result of using new metals of increased hardness, and improved heat treating methods.

These units replace earlier-model Caterpillar tractors, also designated as D-4 and D-6, but were of lower horsepower.

The D-4 tractor is powered by a 4-cycle, 4-cylinder water-cooled engine with bore and stroke of 4½ in. by 5½ in. and piston displacement of 350 cu. in. This model, which measures 10 ft. 11/16 in. in length, has a spring compensated steering-clutch release mechanism which is said to afford easier steering. The D-4, with 43 drawbar horsepower and 48 belt horsepower, offers a 20 per cent increase in work power over the model it replaces, and is available in 60-in. and 44-in. gages.



The Improved Caterpillar D-4 Tractor

The Model D-6 is driven by a 6-cylinder, 4-cycle water-cooled engine with bore and stroke of 4½ in. by 5½ in. and has a piston displacement of 525 cu. in. Like the D-4, this model has an independent, two-cylinder gasoline starting engine and dry multiple-disc clutch with contracting band brake for each track.

The new D-6 tractor develops 65 drawbar horsepower and 75 belt horsepower, said to be an increase of 10 horsepower over comparable figures for the previous model. This unit has a ground clearance of 12½ in., is available in two gages, 74 in. and 60 in., and measures 12 ft. 5 3/16 in. in length.

(For additional information on any of the products described on this page, use postcards, page 419)

Changes in Railway Personnel

General

C. B. Hoffman, acting valuation engineer of the Western Maryland, has been appointed real estate and tax agent, with headquarters as before at Baltimore, Md.

J. P. Kivlen, engineer maintenance of way and equipment of the Northampton & Bath, has been appointed superintendent, with headquarters at Northampton, Pa.

Harold C. Mauney, formerly track supervisor on the Southern, at Keysville, Va., has been appointed superintendent of the Albama Great Southern (part of the Southern system), with headquarters at Birmingham, Ala.

T. C. Carroll has been elected international president of the Brotherhood of Maintenance of Way Employes, succeeding **Elmer E. Milliman,** whose death at Detroit, Mich., on December 31, was reported in the February issue.

A. M. Currier, special assistant engineer on the New York Central, at Cleveland, Ohio, has been appointed assistant to the vice-president, with headquarters at Chicago.

H. L. Woldridge, division engineer of the Northern Division of the St. Louis-San Francisco, at Fort Scott, Kan., has been appointed assistant superintendent, with headquarters at Joplin, Mo., in charge of the Afton subdivision, part of the Carthage subdivision, and part of the Parsons subdivisions, succeeding **H. E. Rook,** transferred.

D. William Brosnan, chief engineer of maintenance of way and structures of the Southern, with headquarters at Cincinnati, Ohio, has been appointed general manager, Central lines, at Knoxville,

D. William Brosnan

Tenn., succeeding **Oliver B. Keister,** who has retired after 60 years of service. Mr. Brosnan was born at Albany, Ga., on April 14, 1903, and received his civil engineering degree from Georgia School of Technology in 1923. He served as resident engineer of the state highway department of Georgia for three years and entered the service of the Southern in March, 1926, as assistant engineer in the maintenance of way department, at Macon, Ga. After serving in various engineering capacities at Chattanooga, Tenn.; Cincinnati; and Somerset, Ky., he was appointed trainmaster at Oakdale, Tenn., being transferred in a similar capacity to Birmingham, Ala., in February, 1938. He was promoted to superintendent at Selma, Ala., in October, 1938, and later served in the same capacity at Macon and at Birmingham. On February 1, 1946, he was appointed chief engineer maintenance of way and structures at Cincinnati.

Engineering

Col. William G. Arn, special engineer on the Illinois Central, with headquarters at Chicago, has retired after 40 years of railroad service.

F. T. Miller, consulting engineer on the Atlantic & Yadkin, has been appointed chief engineer, with headquarters at Greensboro, N. C.

I. A. Moore, trainmaster on the Chicago & Eastern Illinois, at Salem, Ill., has been appointed senior assistant engineer, with headquarters at Danville, Ill.

J. F. Shaffer, office engineer on the Missouri-Kansas-Texas, has been appointed principal assistant engineer, with headquarters at St. Louis, Mo.

D. H. Dowe, general steel bridge inspector of the Seaboard Air Line, has been appointed assistant engineer of bridges, with headquarters at Norfolk, Va.

The office of **V. A. Bennett,** district engineer of the Northern Pacific, at Livingston, Mont., has been moved to Billings, Mont.

Charles W. Bunker has been appointed assistant cost engineer on the Chesapeake & Ohio, with headquarters at Huntington, W. Va.

C. Neufeld, assistant engineer on the Canadian Pacific, has been appointed assistant engineer of bridges, with headquarters at Montreal, Que.

Irving Anderson, division engineer on the Atchison, Topeka & Santa Fe, with headquarters at Chanute, Kan., has retired.

C. F. Burrell, engineer maintenance of way on the Kentucky & Indiana Terminal, at Louisville, Ky., has been appointed chief engineer, with the same headquarters.

A. L. Simpson has been appointed timber treatment engineer on the New York Central System, with headquarters at Air Line Junction, Ohio, succeeding **C. W. Greene,** who has retired after 46 years of service.

H. E. Wilson, whose promotion to district engineer on the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., was reported in the November (1946) issue, was born at Rockwall, Tex., on January 12, 1904, and received his higher education at the University of Texas. He entered railroad service in 1922, and served as chainman, rodman, transitman, and resident engineer on maintenance, location, and construction until December, 1934, when he was appointed assistant engineer in the chief engineer's office at Amarillo, Tex. In 1937 Mr. Wilson was appointed general foreman, bridges and buildings, at Las Vegas, N. M. In 1940 he became roadmaster at Las Vegas, and later, division engineer. From March, 1942, to September, 1945, Mr. Wilson served in the armed forces as captain, major, and lieutenant-colonel.

H. E. Wilson

E. L. Haberle, structural engineer on the Great Northern, at St. Paul, Minn., has been appointed assistant bridge engineer, with the same headquarters. **W. J. Bennett,** assistant bridge engineer, at St. Paul, has retired.

E. B. Harris, supervisor of roadway on the Seaboard Air Line, at Hamlet, N. C., has been appointed assistant division engineer, with headquarters at Jacksonville, Fla.

D. E. Brunn, transitman on the Atchison, Topeka & Santa Fe, at Amarillo, Tex., has been appointed engineer maintenance of way of the Toledo, Peoria & Western, with headquarters at Peoria, Ill.

L. H. Roden, chief draftsman, maintenance of way department, on the Chesapeake & Ohio, has been appointed assistant engineer, with headquarters at Richmond, Va.

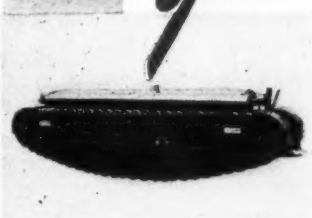
William T. Dorrance, consulting engineer of the New York, New Haven & Hartford, with headquarters at Hartford, Conn., has retired after almost 50 years of railroad service. A photograph of Mr. Dorrance and a sketch of his career appeared in the November, 1946 issue.

J. Edward Griffith, whose promotion to assistant chief engineer maintenance of way and structures on the Southern, with headquarters at Knoxville, Tenn., was reported in the March issue, was born on December 3, 1902, at Charlotte, N.C., and attended the public schools of that city. He was graduated from North Carolina State College in 1926 and entered the serv-

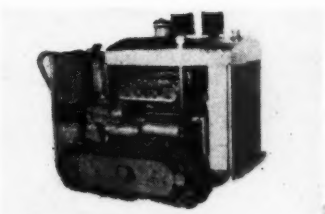
(Continued on page 408)

Put thought as well as money into your next air compressor

get a SCHRAMM

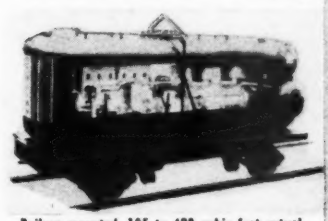


Off-track crawler, gasoline or Diesel. Operates up to 12 tampers.

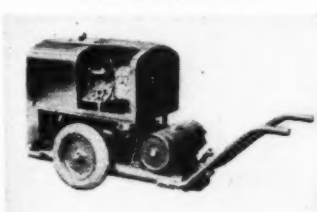


Model 60 Fordair off-track crawler for 4 tampers.

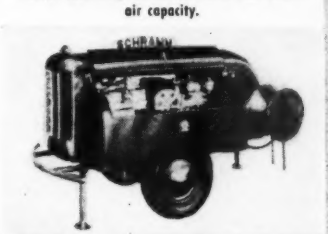
Model 60 self-propelled rail car.



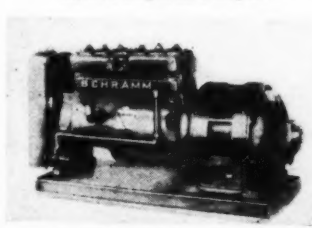
Railcar mounted, 105 to 420 cubic feet actual air capacity.



Model 60 Tampair for 4 tampers.



Two-wheel trailer, 60 to 105 cubic feet actual air capacity.



Stationary models—electric, gasoline, Diesel, and belt-driven.

For greatest efficiency use Schramm tampers and other air tools.

IT stands to reason that you can get a better compressor from America's leading manufacturer of compressors exclusively. For one thing, Schramm is *compressor-wise;* we have been building them for many years. Many features such as clutches and electric starting which are now standard on all good compressors were pioneered by Schramm. Other improvements—positive cam-operated intake valves for maximum air delivery, to mention only one—are found on Schramm compressors alone.

You have certain jobs for compressors to do; Schramm has the models and sizes to do them. A few are shown here. Others to fill any railroad need—maintenance, signaling, switching or shop—are described in the complete Schramm catalog. Address *Railroad Sales Division* for your copy today.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

(*Continued from page* 406)

ice of the Southern in May, 1927, as a junior engineer at Charlotte, subsequently serving in engineering capacities at various points on the road. In August, 1939, he was promoted to trainmaster at Charleston, S.C., later serving in a similar capacity

J. Edward Griffith

at Columbia, S.C. He was appointed assistant roadmaster at Lawrenceville, Va., in April, 1944, and went to Richmond as division engineer in December, 1944.

P. J. Schmitz, division roadmaster on the St. Louis-San Francisco, at Amory, Miss., has been appointed division engineer of the Northern division, with headquarters at Fort Scott, Kan., succeeding **H. L. Woldridge,** whose appointment as assistant superintendent at Joplin, Mo., is reported elsewhere in these columns.

A. H. Whisler, whose appointment as assistant engineer in the office of the chief engineer, system, of the Pennsylvania, with headquarters at Philadelphia, Pa., was reported in the March issue, entered the service of the Pennsylvania on September 14, 1915, and after the completion of his apprenticeship in the signal department, was assigned to various duties in the engineering department until February 8, 1927, when he was appointed assistant supervisor of track. On June 1, 1929, he was promoted to supervisor of track, and on August 1, 1940, he was appointed assistant engineer in charge of organizing rail-laying trains on the Eastern region, under the supervision of the chief engineer maintenance of way, the position he held at the time of his recent appointment.

V. A. G. Dey, whose appointment as division engineer, special duties, on the Bruce division of the Canadian Pacific, with headquarters at Toronto, Ont., was reported in the February issue, was born at Aberdeen, Scotland, on February 4, 1883, and entered the service of the Canadian Pacific in September, 1903, as a draftsman, at Montreal, Que. From 1907 to 1911 he was office engineer on the Quebec, Montreal & Southern. In the latter year he returned to the C.P.R. as assistant engineer at Montreal, and was promoted to division engineer of the Toronto terminals in 1918. In 1920 he was transferred to the Bruce division, and, in 1925, back to the Toronto terminals. Six years later he returned to the Bruce division, where he remained until the time of his recent appointment.

C. I. Hartsell, division engineer on the Pere Marquette, at Saginaw, Mich., has been transferred to the Detroit Terminal and Canadian divisions, with headquarters at Detroit, Mich., succeeding **A. R. Dewees,** who has retired after 46 years of service. **E. J. Hartsell,** division engineer at Saginaw, has assumed jurisdiction over the territory formerly under C. I. Hartsell. **James L. Alvord** has been appointed assistant division engineer, with headquarters at Saginaw.

James S. Wearn, whose promotion to chief engineer maintenance of way and structures of the Western lines of the Southern, with headquarters at Cincinnati, Ohio, was reported in the March issue, was born at Charlotte, N. C., on November 24, 1900, attended the University of North Carolina, entered railroad service on July 1, 1918, and served during summer vacations as rodman in the office of the resident engineer of the Southern at Charlotte. After serving two years with the North Carolina State Highway Department at Raleigh, N.C., Mr. Wearn returned to the service of the Southern as junior engineer at Knoxville, Tenn. In

James S. Wearn

May, 1924, he was appointed assistant engineer in the office of the engineer maintenance of way and structures, becoming track supervisor of the Coster division at Knoxville, in 1928. Mr. Wearn was transferred to the Knoxville division at Knoxville in June, 1929, being appointed assistant roadmaster of that division in 1935. He was promoted to roadmaster of the Memphis division at Sheffeld, Ala., in 1936, which position he held until January 1, 1944, when he became assistant chief engineer maintenance of way and structures of the Central lines at Knoxville, in which capacity he was serving at the time of his recent promotion.

S. H. Shepley, whose promotion to assistant chief engineer of the Elgin, Joliet & Eastern, with headquarters at Joliet, Ill., was reported in the March issue, was born at Minneapolis, Minn., on March 31, 1906, and received his higher technical training at the University of Minnesota. After a year in the office of the bridge engineer of the Northern Pacific, at St. Paul, Minn., he entered the service of the E.J.&E. in 1930 as a draftsman. From 1932 to 1937 he served with the State Highway Department of Minnesota as material inspector, rodman, field and office draftsman, and instrumentman on highway construction and location survey. On Feb-

S. H. Shepley

ruary 1, 1937, he returned to the E.J.&E. as a draftsman, and served in that capacity until September 16, 1939, when he was appointed supervisor of track. On June 1, 1946, he was advanced to division engineer, with headquarters at Gary, Ind., the position he held at the time of his recent promotion.

Track

H. Fraser, roadmaster on the Canadian National, with headquarters at Kindersley, Sask., has retired.

K. E. Stephenson has been appointed supervisor of track on the Chesapeake & Ohio, with headquarters at Huntington, W. Va., succeeding **W. C. Tipton,** deceased.

N. R. Withrow has been appointed assistant supervisor of track on the Russell division of the Chesapeake & Ohio, with headquarters at Russell, Ky., succeeding **C. T. Lamblin,** whose death is reported elsewhere in these columns.

S. H. MacKenzie, assistant roadmaster on the Canadian National, at Moncton, N.B., has been appointed roadmaster at Campbellton, N.B., succeeding **W. A. Bulmar,** who has retired.

G. N. Sells has been appointed roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Woodward, Okla., succeeding **R. B. Bisbee,** whose promotion to general foreman, bridges and buildings, at Dodge City, Kan., is reported elsewhere in these columns.

Malcolm E. Condon, track supervisor on the Erie, with headquarters at Campbell Hall, N.Y., has been transferred to Dunmore, Pa., to succeed **W. R. Worthington,** who has retired because of ill health. **George D. Stoddart,** general foreman at Jersey City, N.J., has been promoted to track supervisor at Campbell Hall, succeeding Mr. Condon. **Charles S. Bray,** general foreman at Buffalo, N.Y., has been

(*Continued on page* 410)

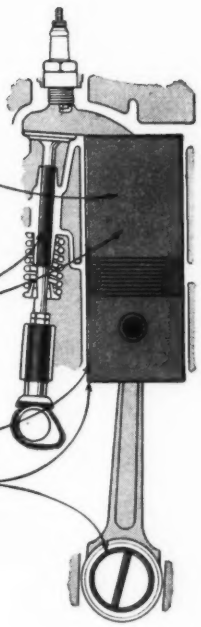
STANDARD ENGINEERS NOTEBOOK

① Adhering agent in RPM Compounded Motor Oil keeps oil film on all parts after engine stops, even on cylinder walls.

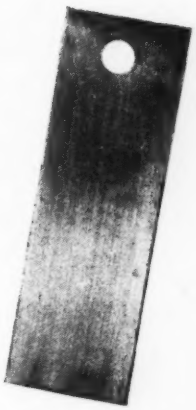
② Rustproofing compounds prevent moisture that condenses on cooling parts from contacting metal.

③ No rust is formed to scrape off when engine starts, and cause excessive wear.

④ Constant lubricant film provides adequate and instant lubrication when engine starts.



This actual photograph shows how one HIGH-QUALITY MOTOR OIL "peeled" off almost all of this test strip of steel when it was placed in corrosive-moisture conditions similar to those in a cooling engine. The oil concentrated at one spot and the unprotected surface quickly rusted.



RPM COMPOUNDED MOTOR OIL kept this strip bright and shiny, completely sealed against rusting, when it was exposed to the same conditions. "RPM" compounds keep a constant rust-proofing lubricant film on engine parts at all times, whether they are idle or moving.

How RPM Motor Oil Rust-Proofs As It Lubricates

Rusting, caused by corrosive moisture, is the greatest source of wear in automotive engines (85%, according to some engineers). It can be controlled by using RPM Compounded Motor Oil.

Additional compounding for "RPM," perfected by Standard of California scientists, provides a rust-proofing lubricant film on internal engine surfaces. The heaviest moisture condensation in idle or cold-running engines will not cut through it.

Other compounds in RPM Motor Oil give it adherent qualities so the film stays on parts at all times. They also loosen and remove gum and lacquer, lubricate hot spots, resist sludge formation, bearing corrosion and stop foaming.

Trademark "RPM" Reg. U. S. Pat. Off.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Colo.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

(*Continued from page* 408)

promoted to track supervisor on the Wyoming division, with headquarters at Dunmore, to replace **James H. Thomas,** who has retired because of ill health.

J. M. Kirschner, supervisor of track on the Williamsport division of the Pennsylvania, at Williamsport, Pa., has been transferred to the Ft. Wayne division, with headquarters at Ft. Wayne, Ind., to succeed **T. F. Scholes,** resigned. **J. W. Harper,** assistant supervisor of track on the Middle division, has been promoted to supervisor of track at Williamsport, succeeding Mr. Kirschner. **R. R. McClain,** assistant supervisor of track on the Columbus division, at Columbus, Ohio, has been transferred to the Middle division, with headquarters at Huntington, Pa., succeeding Mr. Harper, and **G. P. Campbell,** assistant on the engineer corps, New York division, has been promoted to assistant supervisor of track at Columbus, to succeed Mr. McClain.

Water Service

L. Walters, supervisor of water services on the Grank Trunk Western, with headquarters at Detroit, Mich., has retired after 40 years' service.

Kenneth Weir, supervisor of fuel and water service on the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Chicago, has resigned to enter private employment.

W. R. Whitman, inspector water supply on the Chesapeake & Ohio, at Huntington, W. Va., has been appointed chief inspector water supply, with headquarters at Richmond, Va., succeeding **W. Gilbert,** deceased. **I. D. Brown** succeeds Mr. Whitman as inspector water supply at Huntington.

Special

E. Pharand, superintendent of work equipment on the Canadian National, with headquarters at Toronto, Ont., has retired.

F. A. Williams has been appointed supervisor of work equipment on the Chicago, Rock Island & Pacific, with headquarters at Chicago, succeeding **L. J. Turner,** who has retired.

Bridge and Building

R. W. Humphreys, transitman on the Northern Pacific, has been appointed assistant bridge and building supervisor, with headquarters at Missoula, Mont.

R. D. Bisbee, roadmaster on the Atchison, Topeka & Santa Fe, at Woodward, Okla., has been appointed general foreman, bridges and buildings, with headquarters at Dodge City, Kan., succeeding **M. G. Woodward,** who has retired.

J. F. Twomey, master carpenter on the Wilkes-Barre division of the Pennsylvania, at Sunbury, Pa., has been appointed acting master carpenter on the Middle division. **J. D. Moore,** assistant master carpenter on the Philadelphia terminal division, has been appointed acting master carpenter on the Wilkes-Barre division.

Henry Snyder, bridge and building foreman on the Atchison, Topeka & Santa Fe, with headquarters at Galesburg, Ill., has retired.

L. C. Hinsch, assistant engineer on the Chicago, Milwaukee, St. Paul & Pacific, at Savanna, Ill., has been appointed chief carpenter, Superior division, with headquarters at Green Bay, Wis., succeeding **O. H. Czamanske,** who has retired.

Obituary

C. T. Lamblin, assistant supervisor of track on the Russell division of the Chesapeake & Ohio, at Russell, Ky., died recently.

W. Gilbert, chief inspector, water supply, of the Chesapeake & Ohio, with headquarters at Richmond, Va., died in that city on March 11.

George H. Herrnecker, retired division engineer on the Susquehanna division of the Erie, died recently at Hornell, N.Y.

H. L. Currie, office engineer on the Canadian National, with headquarters at Montreal, Que., died recently in that city at the age of 54.

Robert A. Blake, who retired on March 31, 1946, as general building inspector of the Illinois Central, with headquarters at Chicago, died on March 17, at Mobile, Ala.

Chester G. Craig, assistant engineer in the office of the chief engineer of the Chicago & Eastern Illinois, at Chicago, died in that city on March 9. Mr. Craig was graduated from Purdue university in 1910 with the degree of B.S. in Civil Engineering. He entered railroad service in the same year as a draftsman on the Chicago & Eastern Illinois. In June, 1918, he was promoted to chief draftsman, and one month later he was advanced to assistant engineer, the position he held at the time of his death.

Richard R. Metheany, who retired in 1946 as assistant to the chief engineer maintenance of way of the Pennsylvania, with headquarters at Philadelphia, Pa., died on January 14. Mr. Metheany was born at Grand Rapids, Mich., on September 7, 1879, and received his higher technical training at the University of Michigan. He enterted railroad service in 1900 as a rodman on the Grand Rapids & Indiana (now part of the Pennsylvania). From 1901 to 1904 he was an assistant on the engineering corps of the Pennsylvania, and from 1905 to 1912 he served as an assistant division engineer on the lines west of Pittsburgh, Pa. In 1913 he was promoted to division engineer on the same lines, and served in that capacity until 1927, when he was appointed engineer maintenance of way of the Central Pennsylvania division, with headquarters at Williamsport, Pa. In 1940 he was advanced to assistant to the chief engineer maintenance of way at Philadelphia, the position he held at the time of his retirement.

Association News

Track Supply Association; B.&B. Supply Men's Association

Plans are in progress which contemplate another highly successful exhibit of these two associations in Chicago, September 15-18, at the Hotel Stevens, concurrent with the annual conventions of the Roadmasters' Association and the American Railway Bridge & Building Association.

Bridge & Building Association

A routine meeting of the Executive committee was held in Chicago on March 6 to consider the status of committee work and to progress preliminary plans for the annual meeting in September, concurrent with the annual meeting of the Roadmasters' Association. The meeting in September, as noted elsewhere in these columns, will be held at the Hotel Stevens, Chicago, September 16-18.

National Railway Appliances Association

Concurrent with the annual meeting of the American Railway Engineering Association in Chicago, March 18-20, the N.R.A.A. held its largest and most successful exhibit of the last 20 years. Altogether, 101 member companies presented exhibits covering a wide range of machines, tools, appliances and materials of interest to the engineering and maintenance forces of the railways. Elsewhere in this issue is a spread of random photographs taken during the exhibit, showing a representative number of typical exhibit booths and a few of the railway supply representatives and railway men present.

The association held its annual meeting at the Coliseum on Tuesday morning,

(*Continued on page* 412)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

American Railway Engineering Association—Annual Meeting, March 16-18, 1948, Chicago.

American Wood-Preservers' Association—Annual meeting, April 22-24, 1947, Multnomah hotel, Portland, Ore.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association.

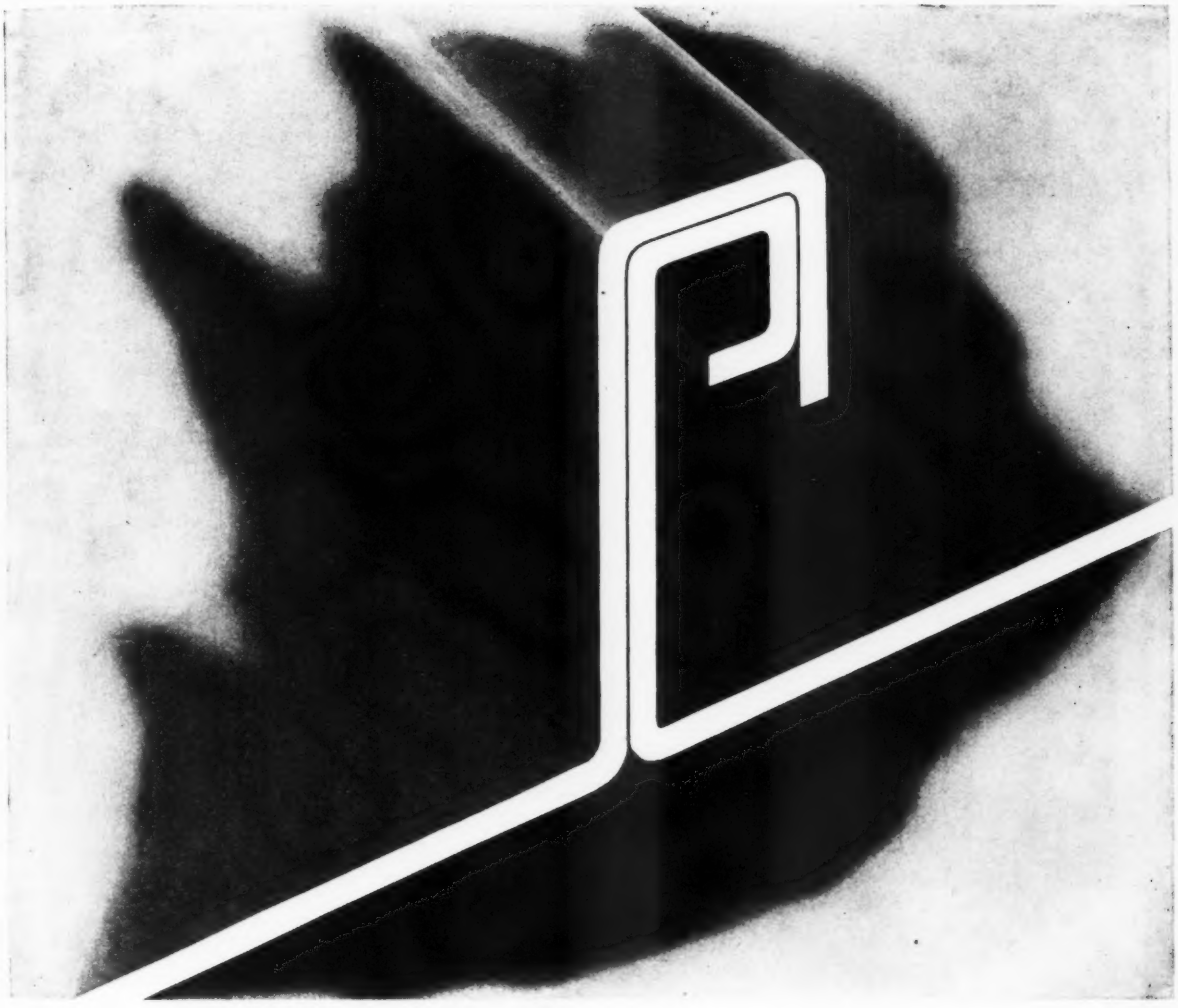
Maintenance of Way Club of Chicago—Next meeting, April 28, Harding's at the Fair, 6:30 p.m.

National Railway Appliances Association—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention.

Railway Tie Association—Annual meeting, September 23-25, 1947, Arlington hotel, Hot Springs, Ark.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association.



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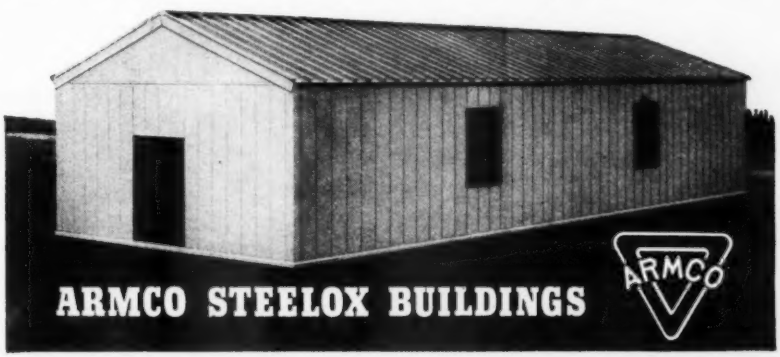
STEELOX Buildings are prefabricated in a wide range of standard sizes to meet your requirements. Write for complete data. Armco Drainage & Metal Products, Inc., 1665 Curtis Street, Middletown, Ohio.



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THE NEW ONAN AIR-COOLED

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Two-cylinder horizontal opposed design gives the new, heavy-duty CK engine unusual running smoothness. Short, rigid crankshaft . . . 2-inch diameter main and 1⅝-inch diameter rod bearings . . . pressure lubrication . . . axial-flow cooling fan . . . aluminum construction giving 4-to-1 cooling advantage over cast iron . . . weighs only 97 pounds and fits neatly into 15" x 19" x 18" space. Designed to solve engine power problems in industry, agriculture and other fields. Proven by thousands in use today . . . now in mass production . . . prompt delivery.

Also has: Built-in precision governor . . . downdraft concentric carburetor for wide-angle operation . . . oil bath air cleaner . . . fuel pump . . . oil pressure gauge . . . crankcase fumes exhausted to carburetor . . . hermetically sealed magneto ignition coil with easy-to-get-at breaker points, 2-qt. oil capacity.

ONAN ELECTRIC PLANTS—A.C.—350 to 35,000 watts in standard voltages and frequencies, D.C.—600 to 10,000 watts, 115 and 230 volts. Battery chargers —500 to 3,500 watts, 6 to 115 volts.

ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 h.p.; BH: 2-cylinder opposed, 5.5 h.p.; 1B: 1-cylinder, 2.5 h.p.

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Built-in electric push-button or automatic starting is optional; adds little to overall dimensions.

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ONAN 4-Cycle ENGINES

(*Continued from page* 410)

March 18. In the election of officers, Clarence E. Mellor, general manager of the Barco Manufacturing Company, was elected president, W. F. Kasper (Fairmount Railway Motors) was elected vice-president, and M. K. Rupert (The P. & M. Company) was elected treasurer. C. H. White (Industrial Brawnhoist Corporation) was re-elected secretary. E. D. Cowlin (Eaton Manufacturing Company—Reliance division) and W. H. Tudor (International Harvester Company—Industrial Power division) were elected directors to serve for two years. R. A. Carr (Dearborn Chemical Company) and Jess Mossgrove (Austin-Western Company) were elected directors to serve for three years. The retiring president, W. J. Hanna (Republic Steel Corporation), will remain as director pro tem for one year.

Roadmasters' Association

The Executive committee met in Chicago on March 17 to review preliminary plans being made for the annual convention in September, concurrent with the annual meeting of the American Railway Bridge & Building Association, and to transact other routine association business. It was reported that the work of the technical committees is well under way and that plans for the convention are progressing favorably. As noted elsewhere in these columns, the convention will be held in the Stevens Hotel, Chicago, September 16-18.

Metropolitan Maintenance of Way Club

The annual meeting of the club, with election of officers, will be held on Tuesday, April 1, at the Hotel Sheraton, N. Y. The principal feature of the meeting will be an address by E. C. Vandenburgh, chief engineer, Chicago & North Western, who will describe the recent installation of 27 units of pre-assembled special trackwork at Western avenue, Chicago—supplementing his description with a motion picture covering the work, supplied by the Ramapo-Ajax division of the American Brake Shoe Company.

Maintenance of Way Club of Chicago

The next meeting of the club, to be held on April 28, will be the annual meeting, and will be addressed by John W. Barriger, president of the Chicago, Indianapolis & Louisville. Mr. Barriger, who is an outstanding exponent of curve and grade reduction and of a track structure commensurate with today's streamliners and higher speeds, will expound his philosophies of "adequate fixed properties" and will tell of the plans on his road, now well under way, for important line and grade revisions, as well as improvements to the track structure. The meeting, which will also feature the election of officers for the ensuing year, will be held in Hardings' Restaurant on the 7th floor of the Fair Store, beginning with dinner at 6:30 p.m.

The March meeting of the club, with an unusually low attendance of 62 due to

(*Continued on page* 414)

COMPRESSION

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Economical, *two-way* protection against creepage. Insures all-around lower track maintenance on main line traffic, bridges, turnouts and crossings—wherever running rail must be stopped.

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To properly protect your employees and your public, install Inland 4-Way Floor Plate . . . the safety surface that is *always* on guard . . . at all places where slips and falls may occur. In large, medium and small patterns, it is conveniently installed on floors, stairs, walkways, ramps, platforms and loading docks. Use it for added safety on vehicles and equipment that you manufacture or use in your plant.

The 4-Way pattern stops slip in all directions . . . cannot warp, crack, splinter, burn, absorb liquids or odors.

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(*Continued from page* 412)

severe snowstorm conditions, was addressed by H. C. Marmaduke, executive representative, Illinois Central System, who spoke on Developing Thinking People. This was a discussion of the employees' suggestion system in effect on the Illinois Central, under which, during the last eight years, more than 210,000 suggestions have been offered and 36,000 accepted and placed in effect.

Wood Preservers' Association

Plans are completed for the 1947 annual meeting of the association at the Multnomah Hotel, Portland, Ore., April 22-24, including a program which will embrace a large number of technical committee reports and 10 or 12 technical papers dealing with matters of special interest to the railroads and the wood preserving industry.

A special convention train, via the Chicago, Milwaukee, St. Paul & Pacific, will leave Chicago at 11 p.m. on Friday, April 18, with a daylight ride through the Rockies and stopovers at The Dalles, Bonneville Dam and Multnomah Falls, arriving in Portland at 4 p.m., April 21, the day prior to the opening of the annual meeting. For reservations on the "Convention Special," members should contact their local railway agents or A. V. Marxen, assistant general agent of the Milwaukee, 100 W. Monroe St., Chicago 3.

American Railway Engineering Association

At the annual meeting of the association in Chicago on March 18-20, with 1,490 members and guests in attendance, it was announced that the following officers had been elected to serve during the ensuing year:

President, Armstrong Chinn, president, Terminal Railroad Association of St. Louis, St. Louis, Mo.; vice-president to serve for two years, F. S. Schwinn, assistant chief engineer, Missouri Pacific Lines, Houston, Tex.; directors: T. A. Blair, assistant chief engineer, Atchison, Topeka & Santa Fe system, Chicago; W. D. Simpson, chief engineer, Seaboard Air Line, Norfolk, Va.; and H. S. Loeffler, assistant chief engineer, Great Northern, St. Paul, Minn. Members of nominating committee are A. B. Chapman, engineer and superintendent bridges and buildings, Chicago, Milwaukee, St. Paul & Pacific, Chicago; E. C. Vandenburgh, chief engineer, Chicago & North Western, Chicago; G. W. Miller, district engineer, Canadian Pacific, Toronto, Ont.; A. B. Stone, assistant chief engineer, Norfolk & Western, Roanoke, Va.; and J. E. Bernhardt, bridge engineer, Chicago & Eastern Illinois, Chicago. In addition, C. H. Mottier, vice-president and chief engineer, Illinois Central System, Chicago, and vice-president of the association, was advanced automatically to senior vice-president, succeeding Mr. Chinn.

The Committees on Outline of Work and Personnel have completed the make-up of committees and assignments of subjects for the ensuing year, and a booklet containing this information will

(*Continued on page* 416)

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BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

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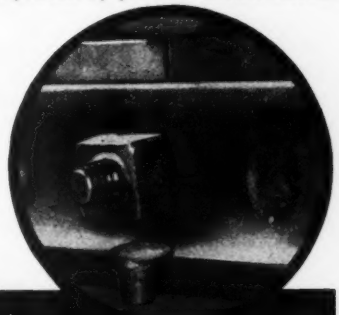
made especially for Railroad Service

BEALL HI-DUTY SPRING WASHERS, being made especially for railroad service are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.



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SPECIALIST MANUFACTURERS OF SPRING WASHERS

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Salt Tablet Dispenser, 500 tablet capacity, extra **$2.75**

Adjustable, Waterproof *Carrying Strap*, extra **$1.15**

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Mounting Bracket, holds fountain to wall or floor of buildings, trucks, tractors, locomotives, etc. . **$4.50**

All prices F. O. B. Elkhart, Indiana. Circular on request.

Dobbins Superbilt
PORTABLE DRINKING FOUNTAIN

(*Continued from page* 414)

be mailed to all members early in April. Four of the committees will begin their work this year with new chairmen. These committees and their new chairmen are as follows: Track—E. W. Caruthers, assistant engineer, Pennsylvania, Philadelphia, Pa.; Highways—W. J. Hedley, assistant chief engineer, Wabash, St. Louis, Mo.; Water Service and Sanitation—H. F. King, special engineer, Erie, Cleveland; and Impact and Bridge Stresses—A. B. Chapman, engineer and superintendent bridges and buildings, Chicago, Milwaukee, St. Paul & Pacific, Chicago. One of the committees—that on Waterways and Harbors—has been discontinued.

President Chinn has called a meeting of all committee chairmen to be held at Chicago on April 18. Committees that have scheduled meetings to be held during April include the Committee on Iron and Steel Structures, which will meet at Washington, D. C., on April 23-24, and the Committee on Economics of Railway Labor, which will meet at Chicago on April 29.

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For the long pull, for the heavy drag, for stubborn and hard-to-handle wire rope jobs, there's only one best fastener, of course . . . dependable CROSBY CLIPS. From the little ⅛-inchers on up to the "jumbo" sizes, made for 3 and 4 inch wire rope (so big you can hardly lift a pair), the CROSBY CLIP line is perfectly complete. They're *drop-forged*, not cast. Hot dip galvanized. Safe, simple, sturdy. Available through distributors everywhere; made exclusively by American Hoist and Derrick Co., St. Paul 1, Minnesota.

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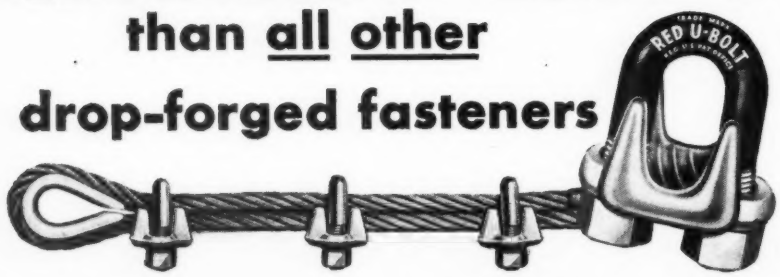

Supply Trade News

Personal

Frederick H. Vogel has joined the laboratory staff of the **Timber Engineering Company.**

John A. Cuneo has been appointed manager of the Los Angeles (Cal.) branch of Fairbanks, Morse & Co.

George W. Sines has been appointed chief engineer of the Car division of the **Austin-Western Company,** Aurora, Ill., succeeding **James D. Benbow,** who has retired.

Ralph D. Holcomb, formerly district manager of the San Francisco, Cal., territory for the **Harnischfeger Corporation,** has been appointed general sales manager of the firm.

Richard C. Newth, formerly railroad service engineer of the **Dearborn Chemical Company,** in the New England territory, has been appointed chemical engineer, railroad department, with headquarters at Nashville, Tenn.

The Link-Belt Speeder Corporation has announced the transfer of its general sales, credit and accounting departments from Chicago to 1201 Sixth street, S.W., Cedar Rapids, Iowa. Communications concerning repair parts for series "300" and "500" machines will continue to be handled at 301 W. Pershing Road, Chicago 9.

P. M. Schoenberg, formerly general superintendent of construction of J. A. Ross & Co., Chicago, has organized his own business. The new organization, **Track Maintenance Specialists,** of which Mr. Schoenberg is president, will specialize in complete track maintenance, including engineering service, tie renewals, alining, rebuilding embankments, exca-

(*Continued on page* 418)

SYNTRON
GASOLINE HAMMER

PAVING BREAKERS

100% Self-Contained

Bust Concrete
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Easier — Faster — Cheaper

An all-around tool, ready to go—on your regular jobs—or in an emergency.

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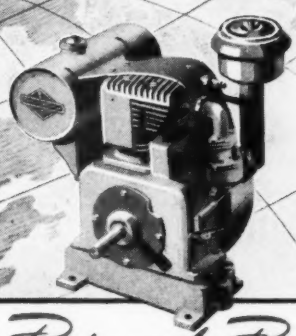

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(*Continued from page* 416)

vating and grading, rail replacement, spot servicing, etc. All work will be done under the direction of Mr. Schoenberg, who has had 26 years of experience in all phases of general construction and railroad maintenance.

J. F. Marquitz has been appointed assistant manager, railroad division, of **Fairbanks, Morse & Co.**, with headquarters at Chicago.

The Rust-Oleum Corporation has announced the appointment of **Walter R. Collins**, of **Collins Oil & Manufacturing Co.**, New York, as representative to handle certain railroads on the east coast. His headquarters will be at 90 West street, New York.

The Gorman-Rupp Company, Columbus, Ohio, has announced the appointment of a new distributor—**Gorman-Rupp Industrial Pumps**, 1741-1743 West Madison street, Chicago, under the direction of **John Obermaier** and **Harry J. DeCosta**, partners, and **Elmer A. Erickson**, sales manager.

William S. Boyce, the announcement of whose appointment as manager of railroad sales of the **Colorado Fuel and Iron Corporation**, with headquarters at Denver, Colo., appeared in the December issue, was born at Del Rio, Tex., and received his higher technical training at Texas A. & M. College. After serving with the National Lines of Mexico on

William S. Boyce

maintenance and construction work, he entered the maintenance department of the Chicago Great Western. Later he served as a roadmaster of the Atchison, Topeka & Santa Fe. Subsequently he served with The Rail Joint Company and the Railroad Supply Company. When the latter company was dissolved, Mr. Boyce organized his own business—the Boyce Tie Plate Company, Chicago. His close association with the Colorado Fuel and Iron Corporation later resulted in the dissolution of his own business, and the beginning of his sales activities for the Colorado Fuel and Iron Corporation.

The Pittsburgh Plate Glass Company has announced the following changes of executive personnel in its merchandising and glass sales divisions: **Richard B. Tucker** has been elected executive vice-president and **Donald C. Burnham**, formerly manager of plate glass sales, and **John A. Wilson**, formerly manager of glass manufacturing, have been elected to newly-created vice-presidencies. **Wallace R. Harper**, formerly manager of the Boston, Mass., warehouse, has been appointed manager of plate glass sales to succeed Mr. Burnham and **William A. Gordon** has been appointed manager of trade sales. **Marvin W. Marshall**, manager of industrial glass sales, will assume direction of plate and safety glass sales to all production accounts and **Felix T. Hughes**, formerly assistant manager of plate glass sales, has been appointed manager of warehouse sales of plate and safety glass.

Lewis H. Harper has been appointed superintendent of the new treating plant of **The American Lumber & Treating Co.**, at Baltimore, Md. Designed for the treatment of lumber with creosote, Wolman salts, and Minalith flameproofing salts, the new plant covers approximately five acres.

Trade Publications

(*To obtain copies of any of the publications mentioned in this column, use postcards, page* 419)

Allis-Chalmers Wheel Tractor—A four-page bulletin describing its Model B wheel tractor with industrial mower has been released by the Tractor Division, Allis-Chalmers Manufacturing Company, Milwaukee 1, Wis. The booklet, known as form No. MS-419, is illustrated with scenes of the tractor in action and with views of some of its new features.

Stonhard Resurfacer—"Over Ruts and Holes" is the title of a new folder issued by the Stonhard Company. It deals with the problems of overlaying or patching floors with Stonhard Resurfacer, which can be applied to floors of concrete, wood, brick, or composition. Information concerning advantages, methods of application, and coverage is included, as well as illustrations and descriptions of Stonhard Resurfacer applied to traffic aisles, platforms, ramps, and heavy-duty floors.

Air Compressors—Schramm, Inc., West Chester, Pa., has just issued a new illustrated eight-page bulletin, No. RM-44, which describes the company's complete line of self-propelled and portable compressors for use on railroad maintenance. The illustrations cover practically every type of mounting for compressors ranging in capacity from 20 to 420 cu. ft. Several pages are devoted to various applications of the Schramm No. 60 Fordair portable compressor. Both track and off-track types are illustrated.

Welding Products—The Air Reduction Sales Company, 60 East 42nd street, New York 17, has announced the publication of a new 64-page catalog which illustrates and describes the company's general welding and cutting products. The catalog is divided into two sections of which one is devoted to oxyacetylene welding and cutting gases, equipment, and supplies, while the other deals with arc-welding machines, accessories, and electrodes. Specially-compiled electrode price lists occupy the last ten pages of the catalog.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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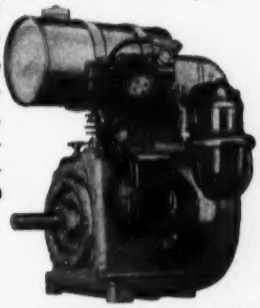
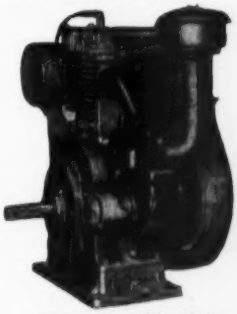


Models AB and AK 4-cycle, single cyl. engine, 2 to 4 hp.



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Model VE-4, V-type, 4-cyl. standard engine, 20 hp.

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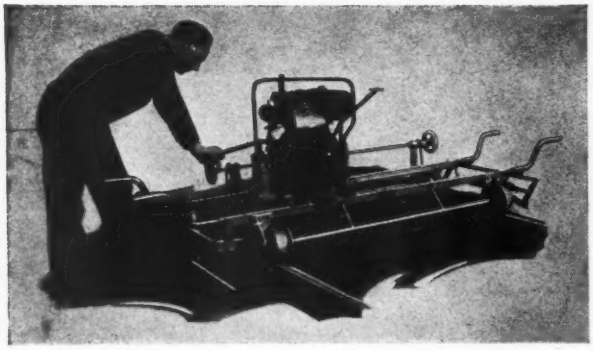

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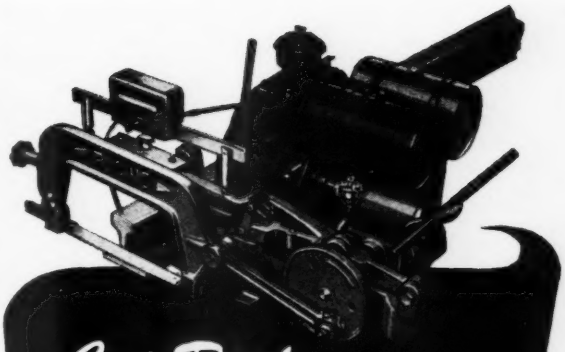

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RIGHT ON THE TRACK
with . . .

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Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

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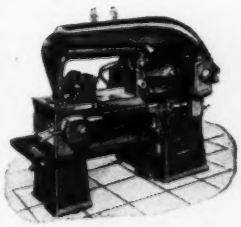

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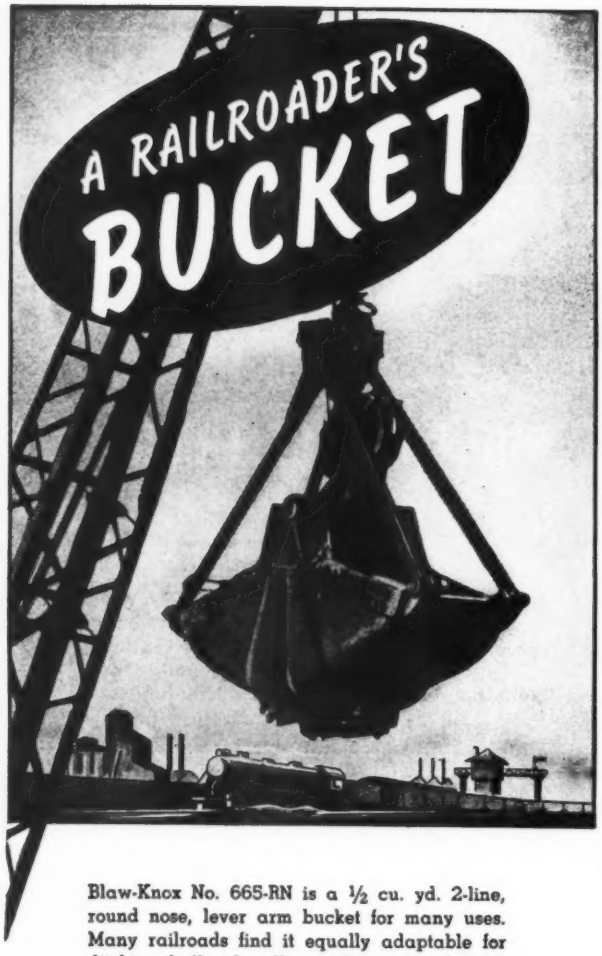

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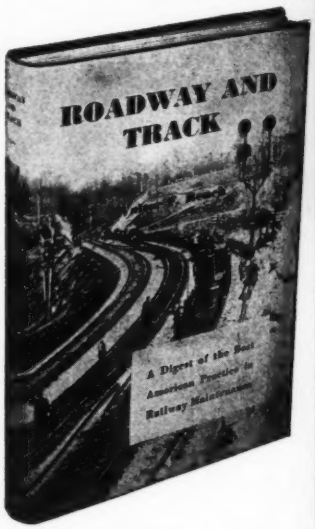
The new edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania*, A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.



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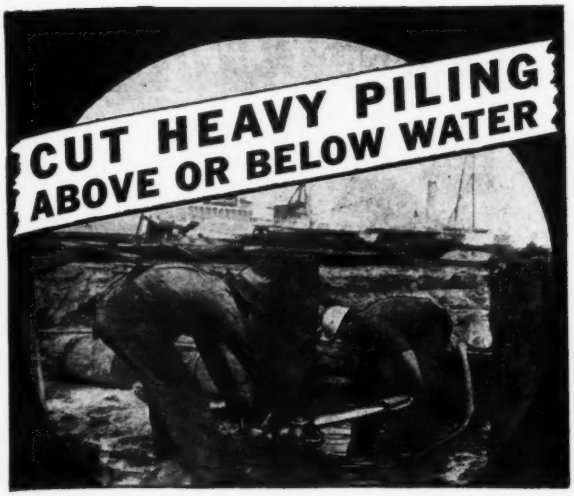

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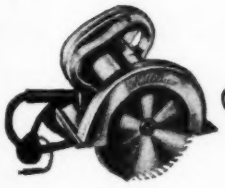

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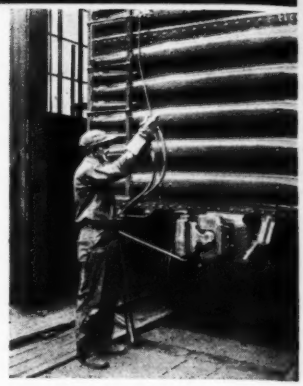

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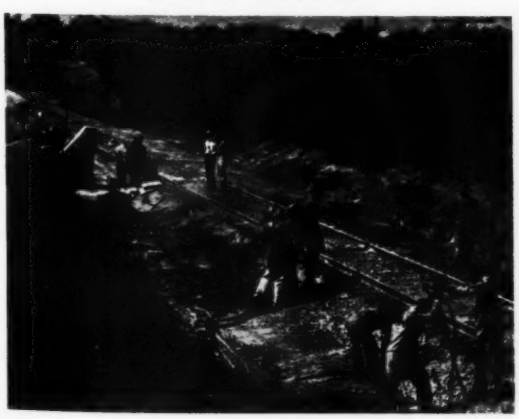

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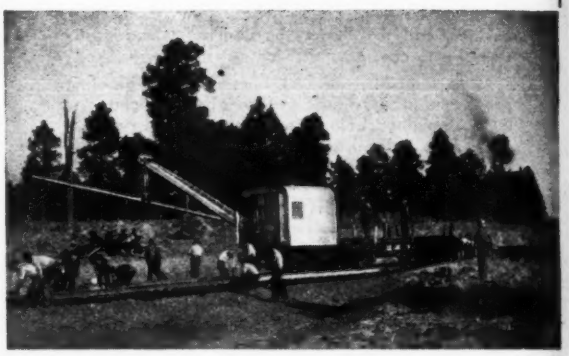

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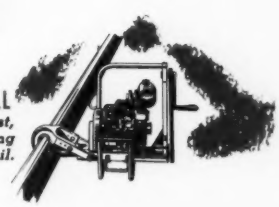

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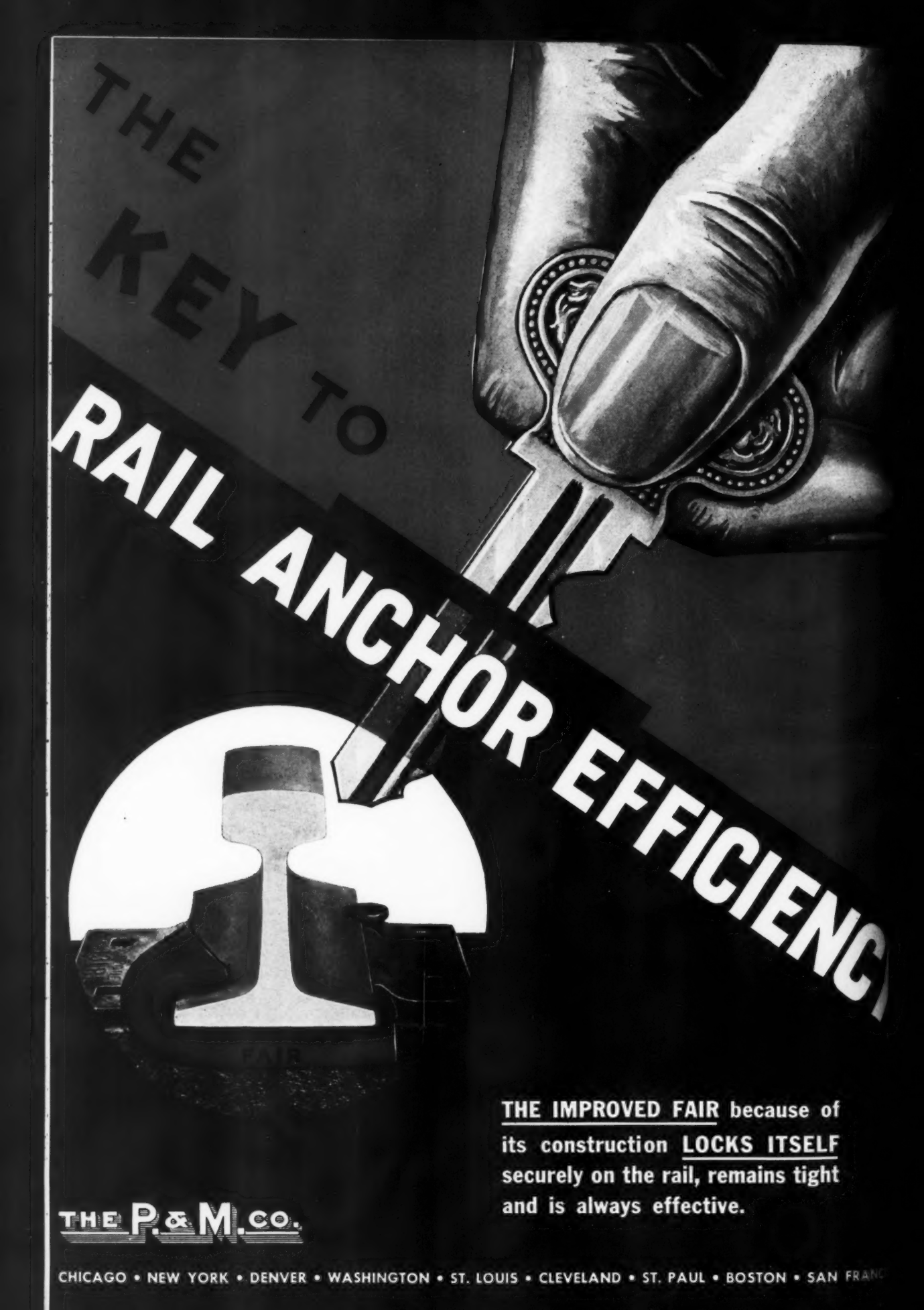
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